REPORT OF THE

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

FISCAL YEAR 1931-1932
and
FISCAL YEAR 1932-1933

MUNICIPAL RAILWAY
WATER DEPARTMENT
HETCH HETCHY WATER PROJECT
HETCH HETCHY POWER SYSTEM
AIRPORT
LIGHTING OF STREETS
LIGHTING OF PUBLIC BUILDINGS

PUBLIC UTILITIES COMMISSIONERS AND DEPARTMENT HEADS

Front row, left to right: Fred Boeken, John J. Sharon, L. T. McAfee, Nelson A. Eckart, Paul J. Ost, B. M. Doolin, Jackson T. Carle. *Second row:* Commissioners Daniel C. Murphy, John H. McCallum, President Lewis F. Byington, Commissioners George Filmer, Edwin M. Eddy. *Standing:* A. F. Freitas, Edward G. Cahill, M. M. O'Shaughnessy, F. B. Gibbon.

REPORT OF THE

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

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FISCAL YEAR 1931-1932
and
FISCAL YEAR 1932-1933

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COMMISSIONERS

LEWIS F. BYINGTON
President

GEORGE FILMER
Vice-President

EDWIN M. EDDY
JOHN H. McCALLUM

DANIEL C. MURPHY

•

EDWARD G. CAHILL
Manager of Utilities

•

FELTON TAYLOR
Secretary of the Commission

JOHN J. SHARON
Auditor

M. M. O'SHAUGHNESSY
Consulting Engineer

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CITY AND COUNTY OF SAN FRANCISCO

PUBLIC UTILITIES COMMISSION
287 CITY HALL

December 5, 1933.

Hon. Angelo J. Rossi,
Mayor of the City and County of San Francisco.

My dear Mayor:

The Public Utilities Commission, in accordance with the provisions of the Charter of the City and County of San Francisco, herewith submits to you a report showing the condition of the various public utilities of the said city and county and the acts and proceedings of the Commission in the operation, construction and management of the same. It is the first report presented by the Commission since the control of the municipally owned utilities of San Francisco was taken over by a Commission appointed by you as Mayor, and created under the provisions of a charter which went into effect January 8, 1932.

The aim of the new charter was to promote efficiency in the management and operation of public utilities by centralizing control in a purely administrative body and to take control away from a legislative body, in which it had theretofore been placed, and also to conduct and manage these utilities with greater economy, thus relieving the taxpayers of an increasingly heavy burden which they were carrying. We have no hesitancy in stating that this objective has been attained under the new system.

The most marked achievement of the Commission, we believe, was the work on the Coast Range tunnel. The tunnel is twenty-eight and a half miles in length, and is a part of the Hetch Hetchy Water System. Since the appointment of the Commission, this work has been carried on by the regular engineering staff and employees of the Commission, under an estimated and submitted bid of $5,257,665.00, which was approximately $600,000.00 less than the bid of any private contractor.

The work is now practically finished and we feel assured will be completed at a cost considerably below said estimate and well within the time limitation. We feel justified in stating that no similar accomplishment has ever before been achieved under municipal management in San Francisco.

Prior to the Commission taking over the control of the San Francisco Airport, there was an average monthly loss of $7,000.00 in the operation thereof. Besides this, there were no regularly scheduled air transports, or air mail, out of San Francisco, and no air mail service from the Airport. Today every air line operating in and out of California either makes San Francisco its terminus or makes regularly scheduled stops there. It is the actual terminus of both transcontinental lines which serve the bay region. Every transport that is permitted to carry air mail now carries it to and from San Francisco, and the former monthly deficit has been practically, and we feel will soon be entirely, eliminated.

In the Water Department there has been a revision and modernization of the accounting system, resulting in a saving annually of $20,000.00. A rearrangement of the water distributing system, now under way, eliminates the expense of pumping plants and will also bring about an annual saving of thousands of dollars. With the completion of the Hetch Hetchy system, pumping will be done away with, resulting in an uninterrupted flow of water from the Sierra Nevada mountains to the homes and manufacturing industries of San Francisco.

In addition to the expenditures for improvements made, the Water Department, during the last fiscal year, contributed practically $900,000.00 to the general fund of the municipality and to the reduction of taxes. Provision has also been made for the reduction of water rates to the extent of 10 per cent for the coming fiscal year.

In the Lighting Department a complete survey of the lighting system has been carried out; an improved installation by property owners in all new subdivisions is provided for, under which arrangement all lights and poles installed become the property of the city, insuring a great saving. Heretofore, an expensive type of pole was erected, the cost thereof assumed by the lighting company and reflected in a marked increase in the rate charged to and paid by the city. As a result, at times charges for lighting one district were, proportionately, 60 per cent higher than for an adjoining district. The Commission has, during the last year, cut the cost of lighting streets and public buildings approximately 20 per cent.

In the Municipal Railway Department, notwithstanding a loss of revenue in the early months of the year affecting all utilities and caused by the world wide depression and resulting loss to all lines of business, the Commission by important rearrangement of service, the elimination of certain lines operating with a large deficit and in places duplicated by other lines, and also by practicing other economies in operation, hopes to see the large deficit which has faced the city at the end of other fiscal years, entirely eliminated this year. A material saving was also made by provision that employees be paid on the job and not receive a time allowance for the purpose of going to the City Hall to collect wages.

Under the provisions of the Raker Act, passed by Congress, San Francisco, in consideration of water rights granted it in the Yosemite National Reservation by the Federal government, was to pay the Federal government $1,250,000.00 for the building and maintenance of public roads in the Reservation. Our Commission and the representatives of the government met and, greatly to the advantage of both the municipality and the United States, decided on a route for road construction, further removed from Hetch Hetchy reservoirs than originally contemplated and opening a highway which will present to the traveler views of matchless beauty and scenic mountain grandeur. Upon payment of said amount, heretofore agreed upon, the Federal government assumed the cost of the maintenance of the road and of the policing and the sanitary protection of the mountain watershed, thus relieving San Francisco of an annual expense estimated at $50,000.00.

We are pleased to add, that the manager of utilities, the heads of departments, the engineers and all other employees under the Commission have proven themselves capable and have shown a fine spirit of co-operation in their work for the city. Moved by this spirit, our united efforts are bound to continue to prove beneficial to the people of San Francisco whose best interest the Commission strives to serve.

Very respectfully yours,

Lewis F. Byington

President, Public Utilities Commission.

CONTENTS

Page
LETTER OF TRANSMITTAL V

ILLUSTRATIONS AND DIAGRAMS XII

REPORT OF THE SAN FRANCISCO PUBLIC UTILITIES COMMISSION 1
  Fiscal Year 1931-32 1
    The New Charter 2
    Organization 4
    Revenue Decrease 5

  Fiscal Year 1932-33 6
    Rate Reduction 7
    Lighting Survey 8
    Hetch Hetchy Agreement 9
    Aqueduct Progress 10
    Utility Financing 11
    Personnel 12
    The Future 13

BUREAU OF PUBLIC RELATIONS 15
  I. General Publicity 16
  II. Publications 16
  III. Complaints 17
  IV. Improvement of Service 17
    Finances 18

SAN FRANCISCO WATER DEPARTMENT 21
  Organization and Personnel 21
  General 22
  Accounts 24
    Condensed Income Statement 26
    Condensed Comparative Balance Sheet 27
  Water Production, Peninsula and Alameda Divisions 28
  City Distribution Division 46
  Pumping Station Accounts, 1932-33 62
    Operating Expenses 63
  Engineering Division 64
    Contract Data 76
  Necessary Extensions, Improvements, Etc. 78
    Additional Bay Crossing Pipe Line 80
    Crystal Springs-University Mound Pipe Line 80
    University Mound Reservoir Addition 81
    Sunset Reservoir and Connecting Pipe Lines 81
    Extension to Main Pipe System 82
    Lake Merced Pump Station 84
    Other Extensions 84
    Financing Extensions 84

CONTENTS—(Continued)

Page

SAN FRANCISCO WATER DEPARTMENT—Continued

Water Sales Division 85
  Net Water Sales 86
  Statement of Consumers' Accounts—Charges and Credits 89
  Water Sales Division Expense 92
  Record of "Bad Water" Complaints 95
  Record of "No Water" Complaints 95

Agricultural Division 97
  Reduction in Rentals 100
  Rental Collections 101
  Share Crop Rentals 101
  Use of Lands Not Leased 102
  Walnut Orchard 102
  Returns and Expenses 106

HETCH HETCHY WATER SUPPLY CONSTRUCTION 109

Facsimile of Letter of Woodrow Wilson 108

Progress and Development 109

Organization 110

Litigation 111

Field Headquarters 111

Emergency Construction to Avert Water Shortage 117

Generation and Distribution of Electrical Energy (1931-32) 121

Red Mountain Bar Siphon 124

Aqueduct, San Joaquin Division 126

Aqueduct, Coast Range Division 128
  Geology 133
  Tunnel Construction Contract 135
  Coast Range Tunnel Data 137
  Gunite Concrete Lining 144

Aqueduct, Bay Crossing Division 149

Finance 151

Current Contract Data, 1931-32 154

Expenditures for Construction, June 30, 1933 158

Disposition of Funds Derived from Sale of Bonds, Etc. 160

HETCH HETCHY POWER OPERATIVE DIVISION (1932-33) 161

Table I—Generation and Disposition Electrical Energy 165

Table II—Condensed Balance Sheet 166

Table III—Comparative Income Statement 168

Engineering 169

Red Mountain Bar Power House 170

Raising O'Shaughnessy Dam 170

CONTENTS—(Continued)

Page

STREET AND PUBLIC BUILDING LIGHTING DEPARTMENT 173

Fiscal Year Ended June 30, 1933 173
Street Lighting 173
Table I—Street Lighting Expenditures 174
Table II—Street Lighting Expenditures by Months 174
Building Lighting 176
Miscellaneous Work 176

SAN FRANCISCO AIRPORT 179

Fiscal Year 1932 179
Traffic 179
Traffic Table 180
Weather 182
Improvements and Additions to Equipment 185
Financial 187
Personnel 187

Fiscal Year 1933 189
Traffic 190
Traffic Other Than Transport 194
Traffic Table 195
Accidents 195
Events 196
Personnel 197
Weather Bureau 197
Financial Report for the Fiscal Year 1932-33 201
Condensed Comparative Balance Sheet 202
Income Statement 203

SAN FRANCISCO MUNICIPAL RAILWAY 205

Chronology 205

Financial Report 208

Report of Audit, 1931-32 212

Comments on Audit 213
Exhibit "A"—Comparative General Balance Sheet as of June 30, 1932, and June 30, 1931 224
Exhibit "B"—Comparative Statement of Monthly Income for the Fiscal Year Ended June 30, 1932 226
Exhibit "C"—Comparative Statement of Income for the Period December 28, 1912, to June 30, 1932 227
Exhibit "D"—Fund Balance Sheet as at June 30, 1932 228
Exhibit "E"—Statement of Bus Line Operations for the Fiscal Year Ended June 30, 1932 229
Exhibit "F"—Adjusted Balance Sheet as at June 30, 1932 230
Schedule 1—Road and Equipment as at June 30, 1932 232
Schedule 2—Analysis Reserve for Depreciation as at June 30, 1932 233
Schedule 3—Statement of Operating Expenses, etc. 234

CONTENTS—(Continued)

Page

SAN FRANCISCO MUNICIPAL RAILWAY—Continued

Operating and Cost Data, 1931-32 236

Comparative Statement Data for Fiscal Years Ended June 30, 1932, and June 30, 1931 236

Comparative Operating Receipt Statement Between Fiscal Years Ended June 30, 1932, and June 30, 1931, Respectively 237

Cost Statement—Itemized Accounts 238

Recapitulation of Cost Statement 241

Report of Audit—1932-1933 242

Comments on Audit 243

Exhibit "A"—Comparative General Balance Sheet as of June 30, 1933, and June 30, 1932 252

Exhibit "B"—Comparative Statement of Monthly Income for the Fiscal Year Ended June 30, 1933 254

Exhibit "C"—Comparative Statement of Income for the Period December 28, 1912, to June 30, 1933 255

Exhibit "D"—Fund Balance Sheet as at June 30, 1933 256

Exhibit "E"—Statement of Budget and Actual Receipts and Expenditures for the Fiscal Year Ended June 30, 1933 257

Exhibit "F"—Statement of Bus Line Operations for the Fiscal Year Ended June 30, 1933 258

Schedule 1—Schedule of Road and Equipment as at June 30, 1933 259

Schedule 2—Analysis Reserve for Depreciation as at June 30, 1933 260

Schedule 3—Statement of Operating Expenses by Primary Accounts as Prescribed by the Inter-State Commerce Commission for the Fiscal Year Ended June 30, 1933 261

Operating and Cost Data—1932-33 264

Comparative Statement Data for Fiscal Years Ended June 30, 1933, and June 30, 1932 264

Comparative Operating Receipt Statement Between Fiscal Years Ending June 30, 1933, and June 30, 1932, Respectively 265

Cost Statement—Itemized Accounts 266

Recapitulation of Cost Statement 269

Summary of Income and Outlay, December 28, 1912, to June 20, 1933 270

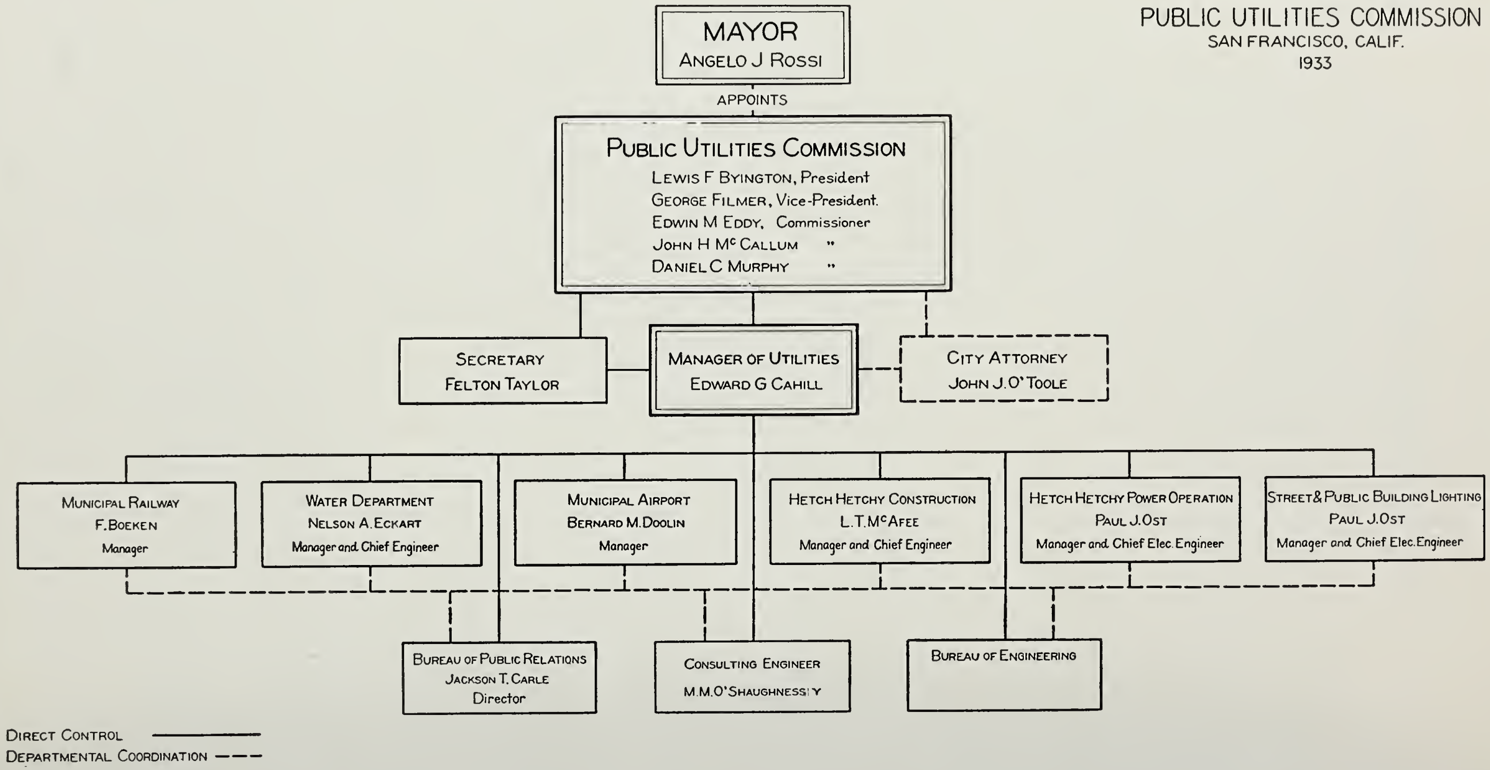
Mileage Statement 274

Bus Routes in Operation—June 30, 1933 275

ILLUSTRATIONS AND DIAGRAMS

Page
Public Utilities Commissioners and Department Heads II
Organization Chart—Public Utilities Commission XII
Pilarcitos Creek Above the "Old Stone Dam" 20
Upper Alameda Creek Tunnel—West Portal 28
New Crystal Springs Outlet 31
New Crystal Springs Aqueduct 42
Crystal Springs Pump Station Extension Under Construction 43
West Portal of Upper Alameda Creek Tunnel as Completed 45
Upper Alameda Creek Diversion Dam (During Construction) 64
Upper Alameda Creek Diversion Dam (10 Days after Completion) 67
Sunol Walnut Orchard 103
Facsimile of Woodrow Wilson Letter 108
Red Mountain Bar Siphon 112
Bridge Over Falls Creek 114
Typical Trail 115
Corral Hollow Pipe Line 118
Moccasin Power House 119
Red Mountain Bar Siphon (Stiffener Rings, Etc.) 125
San Joaquin Pipe Line, Laying Pipe 126
San Joaquin Pipe Line, Cement-Wrapped Pipe 127
San Joaquin Pipe Line at River Crossing 129
General Map and Profile Showing Progress—H. H. Aqueduct 132
Trophy Won by First Aid Team From Mocho Camp 135
Coast Range Tunnel, Test Section 142
Coast Range Tunnel—Concrete Lining (Mixer and Buggies) 145
Coast Range Tunnel—Concrete Lining (Placing and Screeding Concrete in Invert) 146
Coast Range Tunnel, Irvington Portal 147
Coast Range Tunnel, Alameda West Portal 148
Bay Crossing Division 149
Bay Crossing Pipe Line 150
Chart—Hetch Hetchy Water Supply 156
Chart—Annual and Total Expenditures 157
Panorama—San Francisco Municipal Airport 178
Weather Chart 182
Wind Chart 183
Wind Charts 184
Ceiling Heights Chart 185
Airport Personnel Organization Chart—June 30, 1933 186
Night Beacon Atop Hangar No. 1 188
Transport Plane About to Take Off and Hangar 192
Night View of the Interior of the Hangars 193
Municipal Railway—Organization Chart 204
Chart of Average Daily Travel by Months 272
Chart—Total Travel by Fiscal Years 273

ORGANIZATION CHART
PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIF.
1933



REPORT OF THE SAN FRANCISCO PUBLIC UTILITIES COMMISSION

Fiscal Year Ended June 30, 1932,
and
Fiscal Year Ended June 30, 1933

FISCAL YEAR 1931-32:

It may be said that the most important change in the administration, control and operation of San Francisco's municipally owned utilities, during the history thereof, took place in the fiscal year 1931-1932. The fiscal year for the city and county begins on the first day of July of each year.

On March 26, 1931, a new charter for the government of the City and County of San Francisco was submitted to the voters thereof and was ratified by them on that date. The said charter was the result of six months of intelligent and earnest work on the part of a Board of fifteen Freeholders chosen by vote of the people to draft the same.

This new charter was approved by the Legislature of the State of California on April 13, 1931, and went into full force and effect on January 8, 1932, which was practically the middle of the fiscal year 1931-1932.

Setting up a new basic law for the City and County of San Francisco, the new charter entirely superseded the charter of 1900, under which the municipally owned utilities had been administered for thirty-one years.

Under the provisions of the former charter, known as the charter of 1900, San Francisco's seven municipal utility enterprises were managed and controlled by separate and independent departments and boards, namely the Board of Public Works, the City Engineer, and the Board of Supervisors. This decentralization necessarily resulted in confusion, operating waste and lack of a uniform policy in utility control and management.

The San Francisco Municipal Railway had been operated by the Board of Public Works, under ordinances and rules enacted by the Board of Supervisors. Engineering matters in connection with the railway were in the hands of the City Engineer, executive head of a bureau of the Board of Public Works.

The San Francisco Water Department was operated by the Board of Public Works under a special operating ordinance of the Board of Supervisors. The old charter required, as in the case of any city department, that the Board of Supervisors authorize all appropriations, expenditures, land sales or purchases and leases.

San Francisco Airport was under the jurisdiction of the Board of Supervisors, with a committee of that body in direct charge. The City Engineer handled all matters of an engineering nature connected with the airport.

The Hetch Hetchy water construction project and Hetch Hetchy Power System were administered by the Board of Public Works through the City Engineer, with ultimate financial control vested in the Board of Supervisors.

Although the physical work on the city's street and public building lighting systems was performed under the City Engineer, actual control of these utilities was in the hands of the Board of Supervisors.

Thus, the Board of Supervisors, a legislative body, was vested with a large measure of administrative and executive control over utility operations. This control varied with each utility and could not be exercised with efficiency by a body elected by popular vote and organized primarily to handle legislative problems. On the other hand, the Board of Public Works, an administrative body, was hampered in its work through legislative supervision by the Board of Supervisors over administrative details.

The New Charter:

The new charter was designed to overcome these difficulties, to bring about economy and efficiency in the management and operation of municipal utilities, through centralization of all administrative authority in the hands of an appointed Public Utilities Commission, which commission was given power to appoint a Manager of Utilities who would be the chief executive of the commission and, subject to the approval of the commission, have the management of all utilities under the jurisdiction of said commission.

The charter provisions, as embodied in Section 119, limit the authority of the Board of Supervisors to that of requiring reports from the Public Utilities Commission whenever the board, upon its own initiative or through a duly signed petition of electors, "shall determine that the public interest or necessity demands the acquisition, construction or completion of any public utility or utilities by the city and county." This authority is to be exercised under a general municipal policy set forth in the same section, that—"It is the declared purpose and intention of the people of the city and county, when public interest and necessity demand, that public utilities shall be gradually acquired and ultimately owned by the city and county."

From a financial standpoint, the new charter vests control of utility appropriations in the hands of the commission, subject, however, to approval by the Mayor and the Board of Supervisors through adoption of the annual departmental budget. The commission is authorized to make expenditures in accordance with these budgets without further action by the Supervisors.

Section 120 of the charter provides for creation of a Public Utilities Commission in the following language:

> "Section 120. A Public Utilities Commission is hereby created, which shall consist of five members, who shall be appointed by the Mayor and who shall be subject to recall and to suspension and removal in the same manner as elective officers. The term of each Commissioner shall be four years, provided that the five Commissioners first appointed by the Mayor after twelve o'clock noon on the 8th day of January, 1932, shall, by lot, classify their terms so that the term of one Commissioner shall expire at twelve o'clock noon on the 15th day of January in each of the years 1933, 1934, and

> 1935, respectively, and that the terms of two other Commissioners shall expire at twelve o'clock noon on the 15th day of January, 1936, and on the expiration of these and successive terms, the Mayor shall appoint their successors for four years. The compensation of each Commissioner shall be one hundred dollars ($100.00) per month."

Section 121 of the charter gives general powers and duties to the commission as follows:

> "Section 121. The Public Utilities Commission shall have charge of the construction, management, supervision, maintenance, extension, operation and control of all public utilities and other properties used, owned, acquired, leased or constructed by the city and county, including airports, for the purpose of supplying any public utility service to the city and county and its inhabitants, to territory outside the limits of the city and county, and to the inhabitants thereof.
>
> "The commission shall locate and determine the character and type of all construction and additions, betterments and extensions of utilities under its control, and shall determine the policy of such construction or the making of such additions, betterments and extensions from the public funds under its jurisdiction; provided that in each such case it shall secure the recommendation of the Manager of Utilities, which shall be presented in writing and shall include analyses of cost, service and estimated revenues of all proposed or feasible alternatives in cases where it is deemed by the Manager that such alternatives exist.
>
> "The commission shall also have power to enter into contract for the furnishing of heat, light and power for municipal purposes, and to supervise the performance and check the monthly bills under such contract.
>
> "The commission shall have full power and authority to enter into such arrangements and agreements as it shall deem proper for the joint use with any other person, firm or corporation owning or having jurisdiction over poles, conduits, towers, stations, aqueducts, reservoirs and tracks for the operation of any of the utilities under its jurisdiction. It may make such arrangements as it shall deem proper for the exchange of transfer privileges with any privately owned transportation company or system which shall tend toward the betterment of transportation service.
>
> "The commission shall observe all city and county ordinances and the regulations of the Department of Public Works relative to utility openings, structures and poles in streets and other public places, as well as all ordinances and regulations relative to barricades, construction lights, refilling excavations, and replacing and maintaining street pavements; and in connection with all such matters the said commission shall be subject to the same inspection rules and pay fees to the proper department in the same manner and at the same rates as any private person or corporation.
>
> "The commission shall have charge of all valuation work relative or incidental to purchase proceedings initiated by the city and county for the acquisition of any public utility.
>
> "Foreign trade zones, as may be authorized by acts of Congress to be located in the city and county, are hereby declared to be public utilities within the meaning of this charter. A bonded indebtedness for the construction, completion or acquisition of foreign trade zones and the acquisition of necessary lands, buildings and equipment authorized by the electors in accordance with the provisions of this charter shall be exclusive of the bonded indebtedness of the city and county limited by this charter."

Section 122 of the charter provides for the creation of separate departments and bureaus under the commission to operate separate utilities and the creation of bureaus to perform services in engineering and for other purposes common and necessary to all the utilities.

Section 124 provides for appointment of a Manager of Utilities at a salary of $12,000 a year as chief executive of the commission. It reads:

> "Section 124. The Public Utilities Commission shall appoint a Manager of Utilities who shall be the chief executive of the commission and shall, subject to the approval of the commission, have the management of all utilities, bureaus and operations under its jurisdiction. He shall be paid an annual salary of twelve thousand dollars ($12,000.00). He shall hold office at the pleasure of the commission. Subject to the approval of the commission, he shall appoint or remove the heads of departments and bureaus under the commission, exclusive of the civil service provisions of this charter. The Manager of Utilities and the heads of departments and bureaus shall each possess the necessary executive, administrative and technical qualifications for their respective offices. The Manager shall have full power to administer the affairs of the commission as chief executive officer and may, with the consent of the commission, act as the head of any department or bureau created by this charter or by the commission. The salaries of the Manager and heads of separate utilities and bureaus shall not exceed prevailing salaries paid those holding similar positions in comparable private employment."

The charter further provides that the City Attorney shall be the legal adviser of the commission and shall detail to the commission such attorneys as the commission may deem necessary, subject to the approval of the commission as to each such attorney or assistant. The commission shall have authority, subject to the approval of the Mayor, to appoint special counsel for temporary purposes.

Other sections of the charter require civil service classification of employees, budgeting of operating expenses and setting up of reserves, depreciation and other expenses and regulate the fixing of rates.

Organization:

Pursuant to these charter requirements, His Honor, Mayor Angelo J. Rossi named a commission of five members who took office on January 8, 1932. These Commissioners are: Hon. Lewis F. Byington, Hon. George Filmer, Hon. Edwin M. Eddy, Hon. John H. McCallum and Hon. Daniel C. Murphy. Commissioner Byington was president, and Commissioner McCallum a member, of the Board of Freeholders which drafted the new charter.

At its organization meeting on January 11, 1932, the Commissioners drew lots to determine length of terms. Commissioner Lewis F. Byington drew the term expiring on January 15, 1933; Commissioner John H. McCallum drew the term expiring on January 15, 1934; Commissioner Edwin M. Eddy drew the term expiring on January 15, 1935, and Commissioners George Filmer and Daniel C. Murphy drew the terms expiring on January 15, 1936.

By unanimous vote the commission selected Commissioner Lewis F. Byington as president and Commissioner George Filmer as vice-president.

On April 1, 1932, by appointment of the commission, Mr. Edward G. Cahill took office as Manager of Utilities, and Mr. Felton Taylor as secretary of the commission. Both of these appointments followed a careful canvass of the field of those available and best qualified for the posts.

The period of approximately six months, after January 8, 1932, of the fiscal year 1931-1932, was necessarily one of investigation, careful study and of reorganization, with greater economy and efficiency in view in the operation of municipal utilities. The commission, during this time, laid the ground work upon which it has erected a closely-knit and efficient organization for the management and operation of all the city's public utilities, in which the people of the City and County of San Francisco have invested more than $140,000,000.

It may well be realized that it was impossible to accomplish such a revolutionary change in administration without having many problems arise bearing upon matters of interpretation, and of the legal effect of charter provisions.

In this the commission was confronted with many difficulties, but the problems arising have been met and solved.

The commission has also devoted much time to a study of the fiscal and operating problems of the separate utilities and has endeavored to work out definite policies in relation to each.

In addition to its extensive organization work, the commission has accomplished a number of definite improvements in relation to the administration of the separate utilities. These accomplishments are set forth in more detail in an account of the utilities separately treated in this report.

Revenue Decrease:

Doubtless of paramount importance among the matters demanding consideration was that of coping with the subject of the reduction in utility revenues, which assumed increasing proportion during the first six months of 1932, and was felt particularly by the Municipal Railway and the Water Department. In both cases it was necessary to bring about substantial reductions in operating expenses to compensate for loss of revenue and to guard against a deficit. It should be clearly understood that these losses of revenue were the result of existing business conditions, similar reductions of patronage having been experienced by all other utilities throughout the country engaged in the same types of public service.

Realizing the necessity of definitely determining San Francisco's Hetch Hetchy water and power rights and the extent of the obligations imposed upon the city and county under the terms of the Hetch Hetchy grant, the commission initiated negotiations with the United States Department of the Interior looking toward an agreement upon these problems. Such an agreement was reached shortly after the beginning of the fiscal year 1932-1933, and is discussed hereafter in this report.

Of great importance, also, was the decision of the commission to call for competitive bids from private contractors, and also from the engineering staff and the day-labor forces of the departments under the Public Utilities Commission in the matter of the completion of the Coast Range Tunnel Division of the Hetch Hetchy project. Opening of these bids on June 6, 1932, revealed that the Public Utilities Department's offer was approximately $600,000 lower than the bids of the private contractors. The contract was awarded to the city forces after the beginning of the fiscal year 1932-1933, and is discussed hereafter.

FISCAL YEAR 1932-33

With six months of intensive organization work behind it, the Public Utilities Commission moved into the fiscal year 1932-1933 prepared to turn study into results.

The commission found itself again faced with the necessity of taking active measures to counterbalance a continuing decrease in revenues of utilities departments, brought about by economic stringency.

To the credit of the commission, the Utilities Manager and the entire organization, it must be noted that this problem has been met during the fiscal year so effectively that all of the municipal utilities continue on a sound financial basis and without impairment of service. In fact, in many cases, with improvement of service afforded the public.

It has been the constant aim of the commission to meet the need for retrenchment through reduction of operating costs of efficient service, rather than through reduction of services. That this has been possible is largely due to the opportunity for centralization and elimination of duplication under the municipal charter of 1931, heretofore discussed.

A few of the more important of these changes, which are discussed in detail in the sections of this report devoted to the separate departments, may be noted here.

Drastic measures were necessary to meet a serious reduction in revenues of the Municipal Railway through further falling off of patronage, brought about by national financial depression. Beside important rearrangements of service which resulted in reduction of car-hours of operation, the commission on December 5, 1932, eliminated the "A" line which, beside operating with a considerable deficit, had been practically duplicated by sections of other routes, placed in operation after the construction of the "A" line. At the same time the commission ordered a substantial increase in service on the "B" and "C" lines, which had been greatly overcrowded. To give transportation to the small section of the "A" route along Tenth Avenue, not already otherwise served, the No. 1 bus route was extended from its former terminus at Tenth Avenue and Fulton Street, along Tenth Avenue to California Street, thus intersecting both the "B" and "C" lines and providing the only complete crosstown service west of Fillmore Street.

On January 3, 1933, the commission ordered discontinuance of the No. 2 bus line, operating along the Ocean Beach. This route, operated for several years at a large loss, was so little patronized that the commission did not feel that its service to the public justified the large resulting deficit.

Another important economy, coupled with an improvement of service, was brought about by the inauguration of the skipstop system on the western sections of the "B," "C," "N," and "L" lines where very short blocks made it desirable. Beside a saving in power costs, the change has made possible a definite speeding up of schedules and reduction of traveling time between the outer sections of the city and the downtown shopping and commercial area.

Further savings resulted from elimination of pay for Saturday afternoon per diem workers, and the introduction of a new system under which employees are paid on the job and need no longer receive time off to collect their wages at the City Hall.

One of the most important changes in the interests of efficiency and increased service was that brought about for the Water Department and its consumers through a thorough revision and modernization of its accounting, bookkeeping and billing system.

This involved an entirely new routing of meter readers, installation of modern bookkeeping and billing machines, and removal of the adjustment and complaint divisions to offices on the first floor of the Water Department building and made more accessible to consumers.

To avoid discharge of long-time employees, while at the same time saving money for both the department and consumers, workers released by the modern accounting machine system were transferred to the collection department to deliver bills and collect monthly payments, thus enabling consumers to save postage and check taxes. The new system effected savings for the department in excess of $20,000 annually.

Additional operating savings of the Water Department during the year were realized through rearrangement of the distribution system to permit shutting down of pumping plants and reduction of pumping costs.

Two important projects of this nature were placed under way shortly before the close of the fiscal year 1932-1933. Both will be completed during the calendar year 1933. By rearrangement of the distributing system in the Daly Hill district of San Francisco at a cost of $115,000, approximately $40,000 annual pumping costs will be saved and consumers will receive a more reliable service. Construction of new units of the Crystal Springs pumping plant at a cost of $79,000 will enable closing down of the Millbrae pumps, with a consequent saving of $20,000 a year.

Rate Reduction:

The fiscal year 1932-1933 saw a reduction in San Francisco water rates. Effective October 20, 1932, the commission ordered a substantial lowering of standby service charges for automatic fire sprinkler system installations. In its decision to reduce this rate, the commission felt that the charge in San Francisco should be brought into line with that in other cities to encourage location of industrial plants here. It was pointed out that the decrease in rates would lead to installation of more systems, thus affording additional fire protection to the entire city and tending toward reduction of insurance rates.

San Francisco's latest acquired utility, the municipal airport, experienced phenomenal progress during the year. On July 1, 1932, San Francisco Airport was unused for major air transport operating lines. It was the base for a few private and commercial flyers and flying schools, being principally utilized for training of student flyers. Its monthly deficit from operations was approximately $7,000.

During the past year the business of the field has grown by leaps and bounds. It has become the San Francisco terminal for every air transport line carrying passengers, express and air mail in Northern California. These firms include United Air Lines, providing coastwise and transcontinental passenger and mail service; Transcontinental and Western Air, Inc., with coastwise and transcontinental mail and passenger schedules; Pacific Sea-Board Airlines, Capitol Speedlines, Valley Airlines, and Cardiff and Peacock. These transport companies operate forty-eight planes daily into and out of the airport on regular schedule. The monthly loss from operations has been reduced, by economies and through increased revenue, to approximately $1,200.

To accommodate this great influx of business, extensive improvements to the airport have been necessary. During the year the administration building was remodeled and enlarged to provide operating headquarters and radio room, post office, a coffee shop, waiting rooms, ticket and baggage offices. Field-to-plane radio transmitting and receiving equipment, and radio beacons have been installed. Runways have been conditioned, and sewage and electrical equipment improved and enlarged.

Lighting Survey:

The Public Utilities Commission found the city's street and building lighting systems disorganized and expensive to operate. In addition, it was necessary to sharply curtail lighting costs to match a materially reduced tax allotment granted by the Board of Supervisors for the fiscal year 1932-1933. While $865,000 had been allotted for street lighting in said fiscal year, the rate of consumption indicated that by March of 1932 the total cost would be approximately $891,000. An immediate emergency curtailment of lighting distributed throughout the city's business districts was effective in bringing the actual 1931-1932 cost within the budget.

For said fiscal year, the budget was cut to $850,000, but in January of 1933 the commission was notified that only $780,000 would be available because of tax delinquency. It was therefore necessary to reduce lighting costs by approximately 20 per cent for the balance of the fiscal year. Despite its reluctance to reduce illumination, the commission ordered necessary economies. These would have been even more extensive but for revision of schedules and an increased allowance for outage, which brought about a reduction in unit lighting costs.

In the meantime, the commission directed a complete survey of the city's lighting, with mapping of all installations and connections. No such information has heretofore been available. To effect economies in both present and future lighting costs, the commission recommended passage by the Supervisors of an ordinance requiring installation of lighting systems by property owners in all new subdivisions. This measure was subsequently enacted into law. It will mean that lights hereafter installed will become the property of the city and will be illuminated at a saving of approximately 60 per cent of the nightly cost of existing standards which are owned almost entirely by the company furnishing the electric service.

Scientific studies of the lighting of public buildings carried out under the commission's direction have resulted in a substantial reduction of expense with an attendant increase in the effectiveness of illumination. For the first time in many years, the cost of lighting public buildings was within the $46,000 provided by the budget, and no deficit appropriation was requested.

Hetch Hetchy Agreement:

One of the most important matters of policy acted upon by the commission during the year was the agreement concluded with the United States Department of the Interior, the National Park Service and the United States Public Health Service after several months of negotiation. In it the city's rights and obligations under the Hetch Hetchy grant, known as the "Raker Act," are definitely set forth.

Under the terms of this agreement the Federal government has assumed all costs and obligations of road maintenance, policing and sanitary protection in the Hetch Hetchy watershed area lying within Yosemite National Park, thus relieving the city of an annual future expense estimated in excess of $50,000. On the other hand, the city has, under provision of the Raker Act, agreed to pay a total of $1,250,000 from available Hetch Hetchy bond funds in five equal annual installments toward the expense of constructing a new highway from Crane Flat on the Big Oak Flat road to Tuolumne Meadows and Tioga Pass, thus opening an unrivaled recreational area to the citizens of San Francisco, California and the nation.

The advantages of this agreement to the city and to the National Park Service are many. The city is relieved of the obligation to construct roads specified in the Raker Act which would be directly through the Hetch Hetchy watershed and which would be difficult to control from the sanitary standpoint. The city is relieved as well from the obligation to maintain extensive roads and trails at a large and probably increasing expense and from the necessity of patroling and policing the watershed area to prevent pollution of the water destined for domestic and industrial use in San Francisco. At the same time the city will obtain the co-operation of the United States Public Health Service to protect the water supply.

The agreement is of marked advantage to the Yosemite Park Service, as it will open up a vast area of the park heretofore inaccessible and make possible its use for recreational purposes under careful supervision to prevent water contamination. The city's $1,250,000 contribution for a highway in the Merced and Tuolumne Rivers watersheds will bring about construction of a highly desirable project which otherwise would be difficult to finance.

Pursuant to the agreement, the city already has paid one installment of $250,000 toward the Crane Flat-Tioga Pass Road. During the year the National Park Service reconstructed the lodge and public campgrounds at Tuolumne Meadows and built sewage disposal systems to guard against water pollution above Hetch Hetchy reservoir. Plans have been completed for a sewage disposal plant and ranger station at O'Shaughnessy Dam, to be constructed and maintained at Federal government expense.

The Public Utilities Commission takes this opportunity to express its appreciation of the very fine co-operation which has been extended by H. M. Albright, Director of the National Park Service; Colonel C. G. Thomson, Superintendent of Yosemite National Park, and his entire staff in solving the mutual problems which inevitably arise through the presence in a national park of a municipal water supply system. The relations between the commission and the park service have been most cordial. Upon its part, the commission has made every endeavor to assist toward a full use of Yosemite Park for the recreational purposes which were the reason for its creation.

During the year a number of lawsuits have been brought against the city by irrigation districts and riparian land owners who claim an interest in the Tuolumne River for irrigation purposes. These litigants seek to restrain the city from diverting stored water in Hetch Hetchy and Lake Eleanor reservoirs into the Hetch Hetchy aqueduct supplying San Francisco. The commission has engaged special legal and engineering counsel to assist the City Attorney in meeting this litigation. Although the litigation will necessarily be lengthy and expensive, the commission is confident that it will result favorably for the city and that it will be of value in firmly establishing the city's right to floodwaters of the river despite the claims of other riparian owners and appropriators.

Aqueduct Progress:

Progress toward the completion of the Hetch Hetchy aqueduct to bring water to San Francisco has been rapid during the year. As has been noted, the commission on June 6, 1932, received bids for the completion of the Coast Range Tunnel Division, the last division to be constructed in the 150-mile aqueduct leading from the Sierra Nevada watershed. The bid of the commission's Hetch Hetchy Construction Department, namely, $5,257,665, was approximately $600,000 lower than that of private contractors. After a careful study by the commission and checking of the offer by the City Comptroller, the commission on July 25, 1932, awarded the contract to its own department.

The subsequent progress and cost of the tunnel work have amply proved the wisdom of this move. On June 30, 1933, the tunnel operations were several weeks advanced over the contract schedule, with actual costs many thousands of dollars under the unit prices of the bid. It is confidently expected that the tunnel will be completed early in 1934.

The construction department is to be highly commended for the efficiency and dispatch with which it has carried out this difficult tunneling operation, one of the most difficult from an engineering standpoint and in length of tunnel undertaken in the state, and completed at less than the estimated cost and within the bond issue.

Two projects designed to increase revenue from the Hetch Hetchy project and to reduce operating expenses of the Water Department were placed under way by the commission. Appropriations for both are included in budget of 1933-34 by the Board of Supervisors upon recommendation of the Public Utilities Commission.

The first is the laying of a pipe line to carry water released through the tailrace of the Early Intake Power Plant into the aqueduct system so that it can again be used to generate electric energy at the Moccasin Power Plant. The estimated cost of the pipe and construction is $85,000. It is calculated that the city will receive a revenue each year in excess of this through sale of the additional power.

The sum of $350,000 was set aside for construction during 1933-34 of a pipe line seven miles in length, linking Calaveras reservoir of the Water Department with the Hetch Hetchy aqueduct at Alameda Creek. Through it water from the reservoir will flow by gravity into Crystal Springs reservoir on the San Francisco peninsula, avoiding pumping charges which at present amount to $94,000 a year. Approximately $200,000 of construction cost will be saved by utilizing a section of the pipe line laid two years ago for the purchase of an emergency water supply from the Eastbay Municipal Utilities District.

Utility Financing:

One of the most important tasks undertaken by the commission during the year was the completion of studies of extensions and betterments of the city utilities, immediately necessary to afford adequate utility service in the future and to avoid interruption of water and transportation operation.

This problem already has been solved in the case of Hetch Hetchy construction by the voting by the people in May of 1932 of a $6,500,000 Hetch Hetchy bond issue to complete the Coast Range tunnels as above noted.

In the case of the Water Department, however, essential expansion of the delivery and distributing system had been long postponed—first through the policy of the private company which contemplated the sale of the system to the city, consummated in 1930, and secondly by the continued policy of diverting water sales revenue surplus into the city's general fund to make tax savings.

During 1932-1933 it became apparent that some plan of Water Department financing must be worked out. To this end, upon November 8, 1932, a proposed charter amendment authorizing the issuance of revenue bonds up to a limit of $5,000,000 for water system extensions was submitted to the voters, but in that form failed to carry.

By June of 1933 a new plan for issuance of general obligation bonds to the amount of $12,095,000, which it is estimated will pay for construction necessary to care for Water Department needs for a number of years, had been worked out.

Similarly, in the case of the San Francisco Airport, the volume of business and the use of modern, high-speed transport planes, under a ruling of the Federal government, made an extension of the East-West runway essential, by a 25-acre fill at the east end, extending into the bay. The amount required was $260,000.

It may be of interest to note in passing that both these bond issues were approved by the voters on November 7, 1933, following the close of the fiscal year. At the same time the voters approved an issue of $3,500,000 to increase O'Shaughnessy Dam to the ultimate height for which it was planned, thus providing for a great increase in electric energy production and resulting revenues. All three projects, it is expected, will receive Federal aid to the amount of 30 per cent of the cost of labor and materials under the National Industrial Recovery Act.

It is important to note that San Francisco was in a position to take advantage of this offer of Federal funds because of the foresight of the commission in studying the needs of the utilities and working out definite and practical plans for the separate projects.

With the Water Department financing plan decided upon, the commission undertook studies to determine the possibility of substantial water rate reductions to the department's 108,000 consumers. As this report goes to press it is indicated that reduction of approximately 10 per cent in San Francisco water rates will be possible soon after July 1, 1934. This reduction will be a direct consequence of the success of the bond issue, economy in management, and the fact that it will no longer be necessary to use water revenues for expansion of the system. It is hoped that further reductions may be made as conditions warrant.

Personnel:

The personnel of the utility commission remained unchanged during the year. The term of Commissioner Lewis F. Byington, president, expired on January 15, 1933. Commissioner Byington was immediately reappointed by the Mayor, and at its meeting on January 30, 1933, the commission again unanimously elected him president for the ensuing year. Commissioner George Filmer was unanimously re-elected as vice-president for the same term.

Total expenses of the commission, its general office and the offices of Manager of Utilities, Secretary and Bureau of Public Relations for the fiscal year 1932-1933 was $74,900. This represents the general administrative expense for a utility investment in excess of $140,000,000. The budget for 1933-1934 as set up in June, 1933, contemplates expenditures of $66,244 for the same purposes.

The Future:

The Public Utilities Commission looks with confidence toward the future of San Francisco's municipal utilities. Despite unparalleled economic stringency, the city's utilities during the past two years have bettered their service and added to their financial stability. The commission believes that the opportunity afforded by San Francisco's new charter for increased efficiency in public business will be felt in even greater degree in coming years and that the work already accomplished will make itself more apparent as time goes on.

The aim of municipal utilities operation, namely, improved service at lower cost, is a definite objective for the coming year. With this end attained through careful administration in the management of, and the use of sound business judgment in the operation of, our public utilities, the citizen and taxpayer will realize that their confidence in their public servants has not been misplaced and that the city will receive a reasonable return upon its large investment in the means through which public service is rendered.

BUREAU OF PUBLIC RELATIONS

JACKSON T. CARLE

Director

The Bureau of Public Relations of the San Francisco Public Utilities Commission was created by resolution of the Public Utilities Commission adopted on June 27, 1932, in accordance with the authority vested in the commission by Section 122 of the charter of 1931.

This section reads as follows:

> "Section 122. The San Francisco Municipal Railway, the San Francisco Water Department, the Hetch Hetchy project until the completion thereof when it shall be merged with the Water Department, the airport, and any other public utility hereafter acquired, shall each be designated as a department under the commission, and, in addition the commission may create a Bureau of Engineering and such other bureaus as it may deem necessary for the handling of matters that do not pertain exclusively to any one utility or department. The salaries and general expenses of the commission or bureaus thereof not chargeable to a specific utility shall be apportioned fairly among the utilities under the control of the commission in such manner as the commission may deem appropriate, and such apportionment shall be shown as expenses of such utilities."

The resolution passed by the commission, authorizing the creation of a Bureau of Public Relations, was generally explanatory of the purposes and functions of the new department, and stated that the commission considered that it was for the public welfare to keep the taxpayers and the people of the City and County of San Francisco fully advised as to the conduct, operation, and management of the municipality's public utilities, the revenues received therefrom, the costs of operation, and the improvements and changes contemplated, and thus provide the public with a more intimate knowledge of the public utilities under the control of the commission, and give the taxpayers and the public an opportunity to submit suggestions for the conduct and improvement of said utilities, and for that reason adopted the resolution creating the bureau.

Pursuant to this resolution Jackson T. Carle was named on July 6, 1932, immediately after the start of the fiscal year 1932-1933, to the position of Director of Public Relations.

Thus for the first time San Francisco's municipal public service enterprises have enjoyed during the past year the advantages of a public relations organization comparable to those uniformly maintained by privately-owned utilities throughout the United States.

There seems little doubt that work of the bureau during the year has materially contributed toward the establishment of a more cordial relationship and clearer understanding between the city's utilities and their owners, the citizens of San Francisco.

Although a great deal of formative and organization work was inevitable in this new field, certain definite objectives have been reached by the bureau during its first year. Work accomplished may be classified into four primary fields.

I. General Publicity:

Through newspaper and magazine releases, talks before improvement clubs and distribution of information in other mediums, the public has been informed of the current activities and operations of the utilities and the commission. These releases aim to acquaint the citizens with the problems of the utilities, how these problems are being met and the steps which are being taken to improve utility service. The bureau has clipped and filed a total of 9,218 column inches of newspaper and magazine articles published during the year as a consequence of this service.

A very fine response has been noted among civic organizations who are invited to hear discussions of utility projects in which members are interested. It is found that citizens generally are anxious to obtain accurate and non-technical data on municipal utility projects and that many misunderstandings and much baseless criticism can be cleared up in this manner. A two-reel motion picture illustrating construction of the Hetch Hetchy project has been valuable in this work. This film is constantly revised so that it is abreast of current construction.

II. Publications:

Through a regular series of publications the bureau has sought to establish contacts directly with the separate utility consumers. These publications have included leaflets enclosed in bills distributed monthly to 108,000 water consumers, a series of posters displayed in the windows of the Municipal Railway cars and pamphlets descriptive of the Hetch Hetchy project.

In this field the bureau has from time to time compiled reports for the use of the commission and of other city departments where information relative to a specific utility problem or function has been requested.

The bureau has found a very widespread interest among school children in San Francisco in municipal utility operations. More than 20,000 pamphlets descriptive of Hetch Hetchy, the water system and the Moccassin power plant have been distributed through the schools and to individual students. This information is utilized directly in the schools where students are assigned social science problems dealing with municipal water supply and transportation. Pamphlets distributed to the children have been revised and republished twice during the year.

III. Complaints:

The bureau has functioned as a central agency in which complaints may be registered by utility patrons and in this capacity, it has been discovered, is of substantial assistance in acquainting the public with the fact that the Public Utilities Commission is definitely interested in improving utility service.

It should be understood that this service is intended to supplement and not to supplant the individual complaint departments maintained by the separate utilities to which complainants are invited to go for adjustment of their difficulties. It has been the policy of the bureau in this work to adopt so far as is possible the viewpoint of the individual consumer in tracing down and correcting the dissatisfaction. Follow-up letters are designed to ascertain that the complainant is satisfied.

IV. Improvement of Service:

The bureau has found it possible to suggest in a number of instances revision of utility policies and operations, usually of a minor character, which will result in better service to the public. These suggestions are frequently tendered by patrons of the utilities, who are invited to make known their ideas for service improvements.

It is proposed to expand the bureau's work in the field of personnel, particularly with regard to the attitude and conduct of utility employees who come in contact with the public.

There seems little doubt that these services of the Bureau of Public Relations have, during the past year, made themselves tangibly valuable both to the public and to the municipal utilities. On the one hand, the bureau has attempted to interpret for the non-technical citizen the highly technical facts of utility operation, while on the other, it has endeavored to make known to the utilities the viewpoint of their patrons.

It is apparent that the newspapers and the public generally appreciate the existence of an unbiased news source where they may obtain information relative to municipal utility operations. It has been demonstrated during the year that the determination of the Public Utilities Commission to inform the public fully and frankly on utility operations and development has definitely tended to prevent publication of erroneous and untruthful articles, often founded on baseless rumor, which inevitably would reflect discredit upon the utilities.

There is presented herewith a statement showing the expenditures of the bureau during the fiscal year 1932-1933, together with the bureau's budget for the fiscal year 1933-1934, the latter contemplating a considerable expansion of activities in this new field.

BUREAU OF PUBLIC RELATIONS

Expenditures 1932-33

Salaries		$4,040.54
Contractual Service		2,648.83
Printing, engraving, photography	$ 58.45	
Telephone, telegraph, postage	41.02	
Subscriptions—papers, etc.	89.89	
Travel Expense	265.72	
Posters, Folders, Advertising	2,193.75	
Materials and Supplies		26.28
Equipment—Furniture, etc.		208.30
Fixed charges—Retirement System		73.81
		$6,997.76

Budgeted 1933-34

Salaries		$3,570.00
Contractual		8,313.00
Printing, engraving, photography	$ 475.00	
Telephone, telegraph, postage	95.00	
Subscriptions, papers, etc.	142.50	
Travel Expense	475.00	
Posters, folders, advertising	6,650.00	
Employees Welfare	475.00	
Materials and supplies, office stationery, etc.		95.00
Equipment, furniture, etc.		400.00
Fixed charges—Retirement System		246.00
		$12,624.00

PILARCITOS CREEK ABOVE THE "OLD STONE DAM"
The natural charm and beauty of this spot is beyond description.

SAN FRANCISCO WATER DEPARTMENT

N. A. ECKART

General Manager and Chief Engineer

Fiscal Year Ended June 30, 1932,
and
Fiscal Year Ended June 30, 1933

On January 8, 1932, San Francisco's municipal government and the various subdivisions and departments thereof, began to function under a new charter, which had been ratified by a vote of the people on March 26, 1931.

With this new charter there was created a Public Utilities Commission of five members, appointed by the Mayor, which commission is vested with control of the construction, management and operation of all of the city's municipally-owned public utilities. The charter provides for the appointment by the commission of a Manager of Utilities, who shall be the chief executive of the commission. Each of the utilities, including the San Francisco Water Department, is set up as a separate department under the commission, and the several department heads are responsible to the Manager of Utilities. The new commission takes over all of the functions of the old Board of Public Works relative to the control and management of the publicly-owned utilities as well as all administrative authority formerly exercised by the Board of Supervisors, the purpose being to center full authority and responsibility for utility management and control in the one body as against the more or less divided authority which existed under the old charter.

ORGANIZATION AND PERSONNEL

N. A. Eckart	General Manager and Chief Engineer

ACCOUNTING

J. J. Sharon	Auditor
(Also acts as Assistant Secretary Public Utilities Commission)	
Willis O'Brien	Supervising Accountant
(Also acts in similar capacity for Hetch Hetchy Power and Construction Organizations)	
E. J. White	Assistant Auditor
H. M. Kinsey	Cashier

ENGINEERING AND WATER PRODUCTION

T. W. Espy	Engineer of Water Production
I. E. Flaa	Hydraulic Engineer
G. J. Davis	Superintendent Peninsula Division
S. M. Millard	Asst. Supt. Peninsula Division
A. W. Ebright	Superintendent Alameda Division
Walter A. Anderson	Asst. Supt. Alameda Division

WATER PURIFICATION AND SANITATION

G. E. Arnold	Water Purification Engineer

DISTRIBUTION

G. W. Pracy	Superintendent City Distribution
O. G. Goldman	Asst. Supt. City Distribution
J. J. Miley	General Foreman City Pipe System
Joseph Kappeler	General Foreman Service and Meter Dept.

WATER SALES

V. E. Perry	Manager Water Sales Division
A. M. Cooley	Asst. Manager Water Sales Division
W. D. Ryder	Supervisor Consumers Accounts
J. E. Huntoon	Asst. Supervisor Consumers Accounts
A. W. Till	Supervisor of Collections
F. S. Hobro	Asst. Supervisor of Collections
G. H. Ehrhorn	Supervisor Consumers Service Dept.
L. H. Coleman	Chief Adjuster
A. J. Clark	Chief Meter Inspector
J. C. Joost	Supervisor Docks and Shipping Sales

AGRICULTURE AND LANDS

F. W. Roeding	Superintendent Agricultural Division

RETIRED

During the past two fiscal years there were retired five employees whose long and faithful service with the organization should not pass without note. These were:

Retired 1931-32

Thomas Pardow—Senior Clerk	45 Years' Service
Jack Hughes—Main Pipe Foreman	52 Years' Service
Frank P. Larkin—Gateman	37 Years' Service
Otto Hoffman—Stationary Fireman	28 Years' Service

Retired 1932-33

William Johnston—Fireman	45 Years' Service

General:

In the last annual report of the Water Department, under the various division headings, there were described in some detail the functions and responsibilities of the several divisions; the new charter has caused a few changes in the department's organization and operations, the more important of which may be briefly noted, as follows:

The General Manager and Chief Engineer, as the head of the Water Department, reports directly to the Manager of Public Utilities instead of to the Board of Public Works.

Accounting:

Accounts of the department are maintained in accordance with the forms and requirements of the State Railroad Commission, as formerly—the City Comptroller, however, may prescribe the method of installing, keeping and rendering accounts and the financial reports required. He has caused to be installed a system with a complete set of forms which does not permit of any financial obligations being incurred without his approval and his certification that funds are available in the proper appropriation to meet the obligation. The Comptroller audits the accounts of all boards, officers and employees charged with the collection and disbursement of funds.

Water Production, Distribution, Engineering, Etc.:

The principal change affecting these divisions is a provision which requires that in the construction, reconstruction or repair of buildings, streets, utilities or other public works, when the expenditure involved exceeds the sum of $1,000, such work shall be done by contract, except that in an emergency declared by the Board of Supervisors to exist and when authorized by a resolution of that board, the work may be executed in the most expeditious manner. The several departments of the city qualified to perform such work are, however, permitted to bid against the contractors, and must be awarded the contract if they submit the lowest bid, except that the departments may be debarred for repeated overrunning of the bid price in the execution of the work.

While the general policy of performing public work by contract is to be commended, there is certain work in connection with the Water Department system, particularly repairs, replacements or relocation of portions of pipe lines in service, which can be better and more satisfactorily handled by the operating forces and which work should be exempted from the charter provision. The provision for the performance of work in emergencies as provided in the charter is not sufficiently flexible, and consideration should be given to revision at the proper time. Decision in such matters might well rest with the Public Utilities Commission, as the responsible body.

Purchasing:

Mr. Harry LePla, who under the old charter handled purchases for the Water Department exclusively from an office in the Water Department building, has been transferred to the City Hall as Assistant to the City Purchaser, and all department purchases are now handled through the main purchasing office.

Agricultural Division:

Under the new charter, Water Department lands not required for department use may be leased by the department head for agricultural purposes with the approval of the commission. For other purposes such leases are handled through the Director of Property with the further approval of the Board of Supervisors. There does not appear to be any reason for distinguishing between leases for these different uses, and it would seem that if any differentiation is to be made it should be on the basis of the term of the lease rather than the use of the land.

The provision relative to contracts over the sum of $1,000 likewise applies to the Agricultural Division, and it is now necessary to contract the picking of walnuts, etc.

Legal:

Mr. Dion Holm, formerly attorney for the Water Department, has been assigned as attorney for the Public Utilities Commission. The City Attorney, as the legal adviser of the Commission, may with the approval of the commission (instead of the Board of Supervisors, as previously) compromise or settle or dismiss litigation, and shall detail to the commission, subject to its approval as to each, such attorneys as the commission may deem necessary. The commission is given the authority, subject to the approval of the Mayor, to appoint special counsel for temporary purposes.

Water Rates:

Water rates are fixed by the commission, but must be so fixed that the revenue shall be sufficient to pay, for at least the succeeding fiscal year, all expenses of every kind incident to the operation and maintenance of said utility, together with the interest and bond redemption obligations, except that rates producing a lesser revenue may be adopted with the approval of a two-thirds vote of the Supervisors, who must in such event include in the tax levy a sufficient amount to make up the deficit.

Before making any change in rates, a public hearing must be held, and any change in rates must be submitted to the Supervisors for approval, a two-thirds vote of the said board being required to reject any rates submitted, and unless acted upon within 30 days after submission, the rates adopted by the commission become effective.

A year and a half of experience under the new charter has demonstrated the improvement over the old. Many minor difficulties incidental to the change have been ironed out, simplifying interdepartmental procedure and eliminating duplication of effort in certain operations involved, much remains to be done, but progress in this direction is being continually made.

Problems have arisen as to the relative status of various employees under the Civil Service provision; some of these have necessitated court decisions, some have been determined by opinions of the City Attorney, others by the Civil Service Commission. Such problems are to be expected, but the number will decrease rapidly as various rulings are made.

ACCOUNTS

The Balance Sheet of the Water Department as of June 30, 1933, shows Total Fixed Capital as $46,573,940.67 and Unappropriated Surplus of $719,790.46. The investment in plant represents an increase of $336,816.45 over the previous year and $2,665,579.13 since the acquisition of the properties in

March, 1930, due solely to expenditures for plant and equipment made from department earnings in the respective periods.

During the three years and four months of its existence, as set forth in the statement, the department has, after paying all operating expenses, bond interest charges, taxes, etc., built up a surplus of $719,790.40, provided $3,004,647.24 for additions and betterments, redeemed $3,000,000 of its funded debt, and contributed $1,081,000 to the general fund for the reduction of taxes.

The Income Statement shows revenues from Water Sales for fiscal year 1932-33 of $6,337,803.94, for 1931-32 of $6,548,800.39, which figures should be increased to $6,696,294.22 and $6,907,291.67, respectively, to truly reflect the $358,490.28 charges for water furnished free to the other Municipal Departments in lieu of the taxes which the Water Department would have paid to the city under private ownership. Water Sales for fiscal year 1932-33 decreased $210,996.45, as compared with fiscal year 1931-32, and sales for fiscal year 1931-32 decreased $81,588.64, as compared with fiscal year 1930-31. Water Sales within San Francisco decreased $178,275.92 and $45,919.93, and outside of San Francisco $32,720.53 and $35,668.71 for the fiscal year under consideration, as compared with the prior year. This reduction in sales may be directly attributed to the existing depression.

Net Income for the fiscal year 1932-33 amounted to $2,389,308.55 and for year 1931-32 to $2,221,030.65, as compared with $2,534,695.91 for the year 1930-31. This is a decrease of $213,665.26 for year 1931-32, as compared with year 1930-31, and an increase in net income for year 1932-33 of $168,277.90, as compared with year 1931-32. Aside from the falling off in water sales, the decrease in net income 1931-32 over 1930-31 is due primarily to the cost of water purchased, as an emergency measure, the result of the prolonged drought, and the pumping and rental charges incidental thereto, all of which added $249,057.95 to the operating expenses. The increase for year 1932-33 of $168,277.90, as compared with year 1931-32, is principally the result of elimination of the very expenses which caused the decrease in prior year.

In addition to the sum of $1,081,000 transferred to the General Fund for tax reduction purposes, during the two years, there was transferred from the Water Department funds the sum of $19,189.15 to wipe out a deficit accrued through the operation of the old County Line Water Works prior to the creation of the Water Department. Other credit adjustments made during 1932-33, amounting to $1,808.15, reduced this appropriation to $17,381.00.

The books of the Water Department for the fiscal years 1931-32 and 1932-33 were audited by Hood and Strong, and by F. W. Lafrentz Co., Bullock, Kellogg and Mitchell, certified accountants, respectively. These audits showed the accounts to be in order and all recorded receipts from operations regularly deposited with the Treasurer, and accrued and uncollected income properly accounted.

The personnel in the Accounting Department remains the same, but following a survey made by the expert accountant firm of Lybrand Ross Bros. and Montgomery late in 1932-33, a number of changes in accounting methods and system are now being made which will effect a material saving in expense during the next fiscal year.

CONDENSED INCOME STATEMENT

Fiscal Years Ending June 30, 1933, and June 30, 1932 Total March 3, 1930, to June 30, 1933

	Fiscal Year Ended June 30, 1933	Fiscal Year Ended June 30, 1932	March 3, 1930 to June 30, 1933
OPERATING REVENUES—COMMERCIAL SALES			
Metered Service—San Francisco	$ 6,028,207.12	$ 6,215,821.46	$ 20,399,564.27
Outside of San Francisco	232,846.15	265,566.68	905,839.72
Municipal Departments (Overplus Ord. 8691)	76,750.67	67,412.25	232,691.81
Total	$ 6,337,803.94	$ 6,548,800.39	$ 21,538,095.80
OPERATING EXPENSES			
Source of Water Supply	$ 159,523.06	$ 178,719.35	$ 602,512.47
Source of Water Supply—Water Purchased	97,500.00	387,416.20	665,451.10
Pumping	393,628.71	480,294.15	1,455,355.57
Purification	29,823.42	33,797.75	93,227.14
Transmission and Distribution	266,861.91	296,101.76	934,007.50
Rent Deductions (Hetch Hetchy Aqueduct, etc.)	401,040.98	250,761.00	984,065.75
Rent Deductions (Newark-San Lorenzo Pipe Line)	47,025.00	47,981.25	111,462.25
Collections, Reading Meters, etc.	342,813.88	338,697.72	1,135,441.48
General and Miscellaneous	239,719.62	240,418.94	763,674.65
Taxes—Actual	284,639.53	304,979.82	1,121,285.07
Depreciation (Ord. 8691)	60,000.00	60,000.00	200,000.00
Uncollectible Water Bills	19,160.80	18,043.69	52,981.12
Total	$ 2,341,736.91	$ 2,637,211.63	$ 8,119,464.10
NET OPERATING REVENUES	$ 3,996,067.03	$ 3,911,588.76	$ 13,418,631.70
OTHER INCOME			
Rent from Buildings and Lands, including Crop Shares	$ 73,568.52	$ 46,907.89	$ 192,470.74
Walnut Orchard Sales	28,982.12	13,617.67	66,510.43
Interest Earned on Fund Balances	39,782.77	36,579.90	125,227.19
Miscellaneous Income	38.78	50.89	304.84
GROSS INCOME	$ 4,138,439.22	$ 4,008,745.11	$ 13,803,144.90
INCOME DEDUCTIONS			
Interest on Funded Debt	$ 1,710,000.00	$ 1,755,000.00	$ 5,869,750.00
Agricultural, Walnut Orchard and Rent Expense	39,130.67	32,714.46	110,576.26
Total	$ 1,749,130.67	$ 1,787,714.46	$ 5,980,326.26
NET INCOME	$ 2,389,308.55	$ 2,221,030.65	$ 7,822,818.64
Appropriation of Net Income			
For Bond Redemption	$ 1,000,000.00	$ 1,000,000.00	$ 3,000,000.00
For Additions and Betterments	551,373.84	848,513.40	3,004,647.24
To General Fund	808,000.00	273,000.00	1,081,000.00
*Other Appropriations of Income—Net	1,808.15 Cr.	19,189.15	17,381.00
To Surplus	31,742.86	80,328.10	719,790.40

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* Note Equipment written off Prior Years	$ 2,095.00	
Land Purchase Fund Interest Appropriated	286.85	
		$ 1,808.15

CONDENSED COMPARATIVE BALANCE SHEET

June 30, 1933, and June 30, 1932

ASSETS	June 30, 1933	June 30, 1932	Increases	Decreases
Present Balance of Former Spring Valley Property	$43,809,146.43	$43,844,263.04	$	$ 35,116.61
Municipal Water Works	99,215.11	99,215.11		
Additions to Plant and Equipment	2,665,579.13	2,328,762.68	336,816.45	
TOTAL FIXED CAPITAL	$46,573,940.67	$46,272,240.83	$ 336,816.45	$ 35,116.61
Appropriated to City and County General Fund	$ 1,081,000.00	$ 273,000.00	$ 808,000.00	$
Cash on Hand and with City Treasurer (Water Revenue Fund)	$ 299,145.33	$ 184,499.25	$ 114,646.08	$
Accounts Receivable	597,508.14	533,800.05	63,708.09	
Materials, Supplies and Prepaid Expenses	397,824.88	399,343.49		1,518.61
Bond Redemption, Bond Interest and Water Extension Funds	2,266,843.45	2,055,276.86	$ 211,566.59	
Land Purchase and Depreciation Reserve Fund	239,503.89	156,570.00	82,933.89	
Water Department Trust Fund	44,525.19		44,525.19	
TOTAL ASSETS	$51,500,291.55	$49,874,730.48	$ 1,662,196.29	$ 36,635.22
LIABILITIES				
Funded Debt—Bonds Due Serially 1933-1970	$37,000,000.00	$38,000,000.00	$	$ 1,000,000.00
Funded Debt—Accrued and Unpaid	1,885,096.25	1,879,457.50	5,638.75	
Accounts Payable	213,080.82	69,031.50	144,049.32	
Consumers' Deposits and Advances	41,982.49	45,524.24		3,541.75
Reserves and Deferred Credits	289,039.37	213,744.06	75,295.31	
TOTAL LIABILITIES AND RESERVES	$39,429,198.93	$40,207,757.30	$ 224,983.38	$ 1,003,541.75
Earnings 1922-1930 Invested in Plant	4,152,652.24	4,152,652.24		
Valuation Municipal Water Works	100,000.00	100,000.00		
Appropriated Surplus from Operations *Note Detail	7,098,649.98	4,726,273.40	2,372,376.58	
Unappropriated Surplus from Operations	719,790.40	688,047.54	31,742.86	
TOTALS	$51,500,291.55	$49,874,730.48	$ 2,629,102.82	$ 1,003,541.75

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* Appropriated Surplus			
Additions and Betterments	$ 3,004,647.24	$ 2,453,273.40	$ 551,373.84
Bond Redemption	3,000,000.00	2,000,000.00	1,000,000.00
Appropriated to General Fund	1,081,000.00	273,000.00	808,000.00
Other Appropriations	13,002.74		13,002.74
	$ 7,098,649.98	$ 4,726,273.40	$ 2,372,376.58

WATER PRODUCTION

PENINSULA AND ALAMEDA DIVISIONS

The personnel and operation of the Water Production in the Peninsula and Alameda Divisions during the years 1931-32 and 1932-33 continued substantially as outlined in previous reports. Advantage was taken of the record low water level of Crystal Springs reservoir to install that portion of a new outlet system which would be inaccessible with a higher reservoir. The Crystal Springs pump flume and the north 11,000 feet of Stone Dam aqueduct, which transfers water pumped from Crystal Springs reservoir to San Andres reservoir, was replaced during the fall of 1931 with a concrete lined canal; in June, 1933, a contract was let to replace the trestle flume and chute discharging water from the canal into San Andres reservoir with a 72-inch diameter concrete siphon.

Two additional wells were bored at Pleasanton and twelve old ones deepened during the fall of 1931. This additional well construction made it possible to continue the production of 15 million gallons daily from these Pleasanton wells during the period of drought and until the beginning of the floods in December, 1931. The purchase of 30 million gallons daily from the East Bay Municipal Utilities District also continued until January 12, 1932.

The Upper Alameda Creek tunnel and diversion dam were completed and put into operation, diverting Upper Alameda Creek water into Calaveras reservoir during the fall of 1931. During the fall of 1932 the concrete apron

UPPER ALAMEDA CREEK TUNNEL—WEST PORTAL
430 million gallons daily pouring into Calaveras Reservoir.

below the dam was extended downstream 70 feet and a reinforced concrete stilling basin was constructed where the diverted water emerges from the tunnel into Calaveras reservoir.

The extremely shallow depth and the small volume of water in Crystal Springs reservoir during the summer and fall of 1931 permitted the wind and waves to stir up the sediment in the lake and muddy the water. Twenty million gallons daily of water from this reservoir are supplied to University Mound reservoir, through the Crystal Springs pipe line. The turbidity of this water was so high as to require treatment to clarify it, and for this purpose a coagulent of aluminum sulphate was injected into the pipe line at Millbrae and allowed to settle out of the water in University Mound reservoir. This resulted in an exceptionally clear potable grade of water to all the consumers receiving service from the University Mound reservoir, but a very objectionable quality of water for those consumers supplied with water directly from Crystal Springs pipe line before it had emptied into University Mound reservoir and had an opportunity to settle.

The results of this treatment of the water at Millbrae were very gratifying as, although the improvised experimental apparatus for the coagulant injection had been installed at Millbrae for several years, until this year there had never been an opportunity to fully demonstrate the efficacy of the method.

Rainfall:

Although the rainfall for the 1931-32 season was slightly below normal, as shown on Table 1, the rains occurred in such a way as to produce more than the average amount of runoff, with the result that more than an average amount of flood waters was impounded in the storage reservoirs. This permitted the discontinuance of pumping water from the Pleasanton wells and from Lake Merced. Both of these sources had become very much depleted due to the unusually heavy and prolonged draft on them during the past several dry years.

The year 1932-33, however, brought another season of subnormal rainfall, only 14.93 inches falling in San Francisco, which is 67.8 per cent of normal. The catchment during this year amounted to 48.5 per cent of a year's requirements, but due to the large catchment during the preceding year there was plenty of water in storage to meet all requirements, with a good margin of safety, until the rainy season of 1933-34.

Pumping from Pleasanton wells was discontinued December 25, 1931, and excepting for water taken from a few wells which supply local consumption below Pleasanton and for the Town of Sunol, no water has been taken from that source since. Pumping from Lake Merced was discontinued March 9, 1932. Production from the Sunset wells has continued throughout the two seasons.

TABLE NO. 1

Rainfall by Months for San Francisco
Seasons 1931-32 and 1932-33
From U. S. Weather Bureau

Month	Season 1931-32	Season 1932-33	Normal
July	T	T	0.02
August	O	O	0.01
September	T	O	0.45
October	0.68	0.01	1.12
November	2.93	1.00	2.35
December	9.24	2.75	3.95
January	3.23	5.68	4.54
February	3.00	1.13	3.85
March	0.86	2.93	3.14
April	0.47	0.06	1.61
May	0.65	1.36	0.80
June	0.03	0.01	0.18
Totals	21.09	14.93	22.02

Storage:

The amount of water impounded in the various storage reservoirs as a result of the 1931-32 season's rainfall and runoff insured an abundant supply to carry over until the rainy season of 1933-34 even though the 1932-33 season had been a season of minimum rainfall. This abundant yield of water also eliminated the necessity of continuing the purchase of water from the East Bay Municipal Utilities District, which started February 23, 1931, and continued until January 12, 1932, the total amount purchased during this period being 7,888 million gallons.

The runoff from the rainy season of 1931-32 increased the water in storage reservoirs from the low point of 4,291 million gallons on October 17, 1931, to a maximum of 30,916 million gallons on March 2, 1932. By December 31, 1932, the storage had decreased to 18,650 million gallons. The 1932-33 runoff increased the storage to a maximum of 23,389 million gallons on April 5, 1933. By June 30, 1933, the water in storage had reduced to 19,761 million gallons. This water was distributed in the various reservoirs as shown in the following table:

TABLE NO. 2

Storage in Million Gallons

	1930		1931		1932		1933	
	Max. Mar. 23	Min. Dec. 31	Max. Jan. 9	Min. Oct. 17	Max. Mar. 2	Min. Dec. 31	Max. Apr. 5	As of June 30
Calaveras	6,121	567	692	0	19,484	6,237	8,641	4,806
Crystal Sp.	5,840	2,716	2,653	1,026	6,034	8,034	9,574	9,837
San Andres	3,135	2,292	2,404	2,515	4,241	3,122	3,459	3,451
Pilarcitos	422	164	177	208	370	221	471	431
Lake Merced	853	589	599	426	679	929	1,128	1,120
City Resvs.	105	113	109	116	108	107	116	116
Total	16,476	6,441	6,634	4,291	30,916	18,650	23,389	19,761

Wells and Auxiliary Supply:

In addition to the seasonal runoff into the surface reservoirs, Table No. 3 shows the amounts of water obtained from the Pleasanton wells, Lake Merced, Sunset wells, and from the East Bay Municipal Utilities District:

TABLE NO. 3

Water Pumped in Million Gallons

	1930 Mar. 3 to June 30	1930 July 1 to Dec. 31	1931 Jan. 1 to June 30	1931 July 1 to Dec. 31	1932 Jan. 1 to June 30	1932 July 1 to Dec. 31	1933 Jan. 1 to June 30
Pleasanton Wells	1,007	2,783	1,249	2,506	***110	***167	***147
Sunset Wells	0	341	978	1,075	1,040	1,043	1,003
Lake Merced	218	627	403	501	†185	0	0
East Bay Municipal Util. Dist.	0	0	*2,470	5,260	**158	0	0
Total	1,225	3,751	5,100	9,342	1,493	1,210	1,150

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* Start of delivery of water February 23, 1931.

** Stopped January 12, 1932.

*** Local consumption between Pleasanton Wells and Town of Sunol.

† Stopped March 9, 1932.

NEW CRYSTAL SPRINGS OUTLET

Horizontal, cylindrical screens for the upper two outlet tunnels in the foreground; a third screen for a lower tunnel is submerged 35 feet at this stage. A similar screen was installed on the lower tunnel of the old outlet tower, submerged 42 feet.

Productivity:

The following table shows the maximum and minimum amount of water in storage for the fifteen years 1918 to 1933, inclusive; also the draft from wells, water purchased from East Bay Municipal Utilities District, and the total amount of water drawn from these sources to meet consumption requirements. This table does not include the water drawn directly from runoff for consumption.

TABLE NO. 4

Surface Storage and Draft, Also Showing Draft from Underground Storage, in Million Gallons

1	2	3	4	5	6	7	8	9
Year	Maximum Storage	Minimum Storage	Storage Increase During Season	Storage Loss During Season	Draft From Pleas'ton Wells	Draft From Sunset Wells	Draft From East Bay M.U.Dist	Storage Loss Plus Underg'd Draft
1918	20,388	....	....	....	....	....	....	....
1918	....	12,382	....	8,006	3,603	....	....	11,609
1919	22,388	....	10,006	....	....	....	....	....
1919	....	13,160	....	9,228	2,000	....	....	11,228
1920	16,578	....	3,418	....	....	....	....	....
1920	....	9,986	....	6,592	2,871	....	....	9,463
1921	19,763	....	9,802	....	....	....	....	....
1921	....	11,502	....	8,236	317	....	....	8,603
1922	20,091	....	8,589	....	....	....	....	....
1922	....	12,770	....	7,321	397	....	....	7,718
1923	22,649	....	9,879	....	....	....	....	....
1923	....	11,721	....	10,928	515	....	....	11,443
1924	11,721	....	0	....	....	....	....	....
1924	....	4,266	....	7,455	4,726	....	....	12,181
1925	13,585	....	9,319	....	....	....	....	....
1925	....	4,959	....	8,626	2,666	....	....	11,292
1926	17,859	....	12,900	....	....	....	....	....
1926	....	9,618	....	8,241	2,536	....	....	10,777
1927	30,581	....	20,963	....	....	....	....	....
1927	....	20,000	....	10,581	2,104	....	....	12,685
1928	30,687	....	10,687	....	....	....	....	....
1928	....	18,657	....	12,030	762	....	....	12,792
1929	20,265	....	1,608	....	....	....	....	....
1929	....	8,906	....	11,359	4,054	....	....	15,413
1930	16,475	....	7,569	....	....	....	....	....
1930	....	6,441	....	10,034	4,073	341	....	14,448
1931	6,779	....	338	....	....	....	....	....
1931	....	4,291	....	2,488	3,812	2,054	7,731	16,085
1932	30,916	....	26,625	....	....	....	....	....
1932	....	18,650	....	12,266	277	2,083	157	14,783
1933	23,389	....	4,739	....	....	....	....	....
1933	....	....	....	....	....	....	....	....
AVERAGE			9,096	8,894	2,448	1,493	3,945	12,035

Consumption:

The average daily consumption for the years 1931-32 and 1932-33 amounted to 52.1 and 49.1 million gallons per day, respectively. A comparison of the past three years' consumption is shown in Table No. 5.

TABLE NO. 5

Consumption in Million Gallons Per Day

	San Francisco	Average Suburban	TOTAL System	Max. Day	Min. Day	Max. Month Average	Min. Month Average
1930-31	49.8	3.1	52.9	69.2	41.5	57.8	47.0
1931-32	49.3	2.8	52.1	65.6	39.6	59.4	47.5
1932-33	46.4	2.7	49.1	60.4	39.9	54.3	44.6

An average of 23.4 million gallons per day during 1931-32, and 25.5 million gallons per day during 1932-33, was delivered through the three transmission pipes having their source at San Andres reservoir, and 18.1 and 15.1 million gallons per day in the same year, to University Mound through the Crystal Springs pipe line, divided as follows:

1931-32 M.G.D.	1932-33 M.G.D.	
7.2	7.0	through San Andres 54" pipe
5.9	5.8	through College Hill 30" supply pipe
10.3	12.7	through Baden-Merced Branch pipe
18.1	15.1	through Crystal Springs pipe line

An average of 5.8 and 5.6 million gallons daily was drawn from Sunset wells and 1.9 and zero million gallons daily from Lake Merced during the years 1931-32 and 1932-33, respectively. The combined delivery from all the transmission pipes to the suburban consumers averaged 2.8 million gallons per day in 1931-32 and 2.7 million gallons per day in 1932-33.

An average of 17.1 million gallons per day was transferred from the Crystal Springs reservoir to the San Andres reservoir system in 1931-32 and 21.0 million gallons per day in 1932-33.

An average of 45.2 million gallons per day in 1931-32 and 46.0 million gallons per day in 1932-33 were transferred from the Alameda Creek sources and the East Bay Municipal Utility District, to the Crystal Springs reservoir system. Of this amount, 14.7 and 15.9 million gallons per day in 1931-32 and 1932-33, respectively, were delivered through the Alameda supply pipe to Belmont pumps, from which point Belmont pumps boosted the water through the 36-inch and 54-inch Alameda pipe into the 44-inch Crystal Springs discharge pipe line. The balance, 30.5 and 30.1 million gallons per day, respectively, were transported through the Bay Division Hetch Hetchy pipe line and Pulgas tunnel into Crystal Springs reservoir.

The amount of water obtained from different Alameda sources is shown in the following table:

TABLE NO. 5-A

Average Yearly Draft on Alameda Sources in Million Gallons Daily

	1930-31 M.G.D.	1931-32 M.G.D.	1932-33 M.G.D.
Pleasanton Wells	11.1	6.9	0.9
Sunol Filters and Calaveras Reservoir	18.5	23.5	45.1
East Bay Municipal U. Dist	6.3	14.8	0
TOTAL	35.9	45.2	46.0

Water was purchased from the East Bay Municipal Utility District from February 23, 1931, to January 12, 1932; from July 1, 1931, to January 12, 1932—a total of 5,417,905,000 gallons were purchased; this is equivalent to 27.8 million gallons per day for the actual period of delivery or 14.8 million gallons per day for the fiscal year. This water was boosted at San Lorenzo pump station through the Newark-San Lorenzo pipe line into either the Alameda supply line to Belmont pumps or through the Bay Division Hetch Hetchy pipe and Pulgas tunnel into Crystal Springs reservoir.

TABLE NO. 6

Water Pumped Outside of San Francisco Average in Million Gallons Daily

Pump Station	1930-31	1931-32	1932-33
Millbrae Pumps	11.8	10.3	8.0
Crystal Springs Booster	17.2	10.6	0.4
San Andres Pump	14.7	6.8	13.1
Belmont Pumps	16.5	16.6	16.0
Bay Pulgas Pumps	20.1	28.7	30.0
Pleasanton Pumps	11.1	7.2	0.9
San Lorenzo Pumps	19.3*	27.6**	0

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* From February 23 to June 30, 1931.

** From July 1, 1931, to January 12, 1932.

Pumps in San Francisco

City Pumps	6.5	6.3	7.0
Central Pumps	5.4	5.5	5.5
Sunset Wells	5.3*	5.8	5.6

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* Started October 25, 1930.

Tabulation No. 7 shows the average daily consumption for the past 67 years:

TABLE NO. 7

Average Daily Consumption in Million Gallons from 1865 to 1932

Year	M.G.D.	Year	M.G.D.	Year	M.G.D.	Year	M.G.D.
1865	2.4	1884	15.2	1903	31.6	1922	36.4
1866	3.2	1885	17.0	1904	33.8	1923*	40.9
1867	3.7	1886	16.9	1905	34.9	1924	41.7
1868	4.3	1887	19.1	1906	29.2	1925	42.6
1869	5.5	1888	18.3	1907	30.6	1926	46.2
1870	6.0	1889	16.8	1908	31.6	1927	48.4
1871	6.6	1890	20.4	1909	34.1	1928	50.1
1872	7.5	1891	19.3	1910	35.6	1929	52.1
1873	8.6	1892	19.5	1911	37.4	1930	52.1
1874	9.6	1893	19.1	1912	39.1	1931	52.8
1875	11.7	1894	19.4	1913	39.7	1932	50.4
1876	12.7	1895	19.9	1914	39.4	....	......
1877	11.9	1896	21.3	1915	42.6	....	......
1878	11.4	1897	23.7	1916	40.9	....	......
1879	12.2	1898	23.2	1917	38.2	....	......
1880	12.7	1899	25.0	1918	37.2	....	......
1881	13.8	1900	25.5	1919	35.7	....	......
1882	14.9	1901	26.7	1920	36.2	....	......
1883	15.1	1902	27.7	1921	36.3	....	......

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* Year 1923 and following years include suburban consumption.

Operation:

The operation and maintenance of the water production facilities were carried on similarly to previous years. The continued lack of normal rainfall was materially reflected in the increased costs of the production facilities for the year 1931-32. This was particularly noticeable in connection with the operation and maintenance of the Pleasanton wells, the Newark-San Lorenzo pipe line and pumping plant; the purchase of East Bay water; the cost of pumping water at Crystal Springs, and the purification of water. The good catchment during the rainy season 1931-32 materially reduced the water production costs for the year 1932-33.

Table No. 8 is a statement of the operating expenses of the Alameda and Peninsula Divisions for the past fiscal year, compared with the year previous.

TABLE NO. 8

Operating Expenses, Fiscal Years Ending June 30, 1931, June 30, 1932, and June 30, 1933, Units in Divisions Outside San Francisco

PUMP STATIONS	1930-1931	1931-1932	1932-1933
Belmont Pump	$ 68,763.04	$ 64,230.55	$ 62,339.39
Millbrae Pump	41,771.85	38,994.36	33,144.86
Crystal Springs Pump	73,712.99	46,274.30	52,791.17
Bay Division Pump	55,494.76	77,574.38	79,794.35
Pleasanton Pumps	49,123.78	42,065.80	7,868.01
Pleasanton Township Water Dist.	4,645.46	6,131.69	5,236.52
San Lorenzo Pump	15,616.87	43,624.38	2,852.41
	$309,128.75	$318,895.46	$244,056.71
PURIFICATION SYSTEMS			
Alameda Chlorination Station	$ 3,303.75	$ 4,730.39	$ 8,085.21
San Mateo Screen Tank	119.88	153.31	1,383.89
Millbrae Purification System	493.35	6,577.87	50.48
Belmont Purification System	724.87	608.40	658.30
San Andres Purification System No. 1	412.89	645.68	978.81
San Andres Purification System No. 2	1,500.14	1,597.39	1,861.42
Crystal Springs Purification System	3,027.34	6,066.42	3,366.07
San Andres Reservoir	593.97	1,284.37	1,395.81
Calaveras Reservoir	890.48	482.08	3,257.92
Pilarcitos Reservoir		30.47	94.74
Irvington Portal Chlorine System			4.30
	$ 11,066.67	$ 22,176.38	$ 21,136.95
RESERVOIRS AND SOURCES			
Surface Sources			
San Andres Reservoir	$ 15,843.85	$ 8,717.23	$ 10,907.48
Crystal Springs Reservoir	24,442.80	26,381.86	27,091.30
Pilarcitos Reservoir	28,258.02	31,200.78	18,961.80
Calaveras Reservoir	5,723.64	8,188.24	11,957.05
Newark-San Lorenzo Pipe Line, Water Purchased for Resale	180,534.90	387,416.20	97,500.00
	$254,803.21	$461,904.31	$166,417.63
Ground Sources			
Sunol Filter Beds	$ 10,511.06	$ 13,531.38	$ 10,182.82
Pleasanton Wells	6,908.99	3,349.21	2,624.09
	$ 17,420.05	$ 16,880.59	$ 12,806.91

SUPPLY AND TRANSMISSION LINES			
Supply Lines			
Bay Division Pipe Line	$ 31,424.18	$ 2,548.52	$ 10,322.04
Niles Irvington Pipe Line	446.48	1,100.76	483.59
Niles Supply Line	.24	127.02	14.32
Pleasanton Pump Supply Line	1,093.67	506.73	27.56
Stone Dam Aqueduct	26,923.73	6,111.13	5,919.84
Pilarcitos Aqueduct	10,402.47	2,382.27	28.53
San Andres Aqueduct	5.94		
Millbrae Pump Supply Line	10.33		95.61
Crystal Springs Pump Supply Line	130.70	86.94	115.52
Sunol Supply Line	34.15	152.70	44.22
Belmont Pump Supply Line		5,372.19	354.18
Upper Alameda Tunnel		2,020.25	686.69
Upper Alameda Creek Diversion Dam		1,959.44	919.24
	$ 70,471.89	$ 22,367.95	$ 19,011.34
TRANSMISSION LINES			
Alameda Supply Line	$ 6,559.99	$ 4,435.38	$ 4,670.81
Alameda Transmission Line	1,552.81	1,746.61	3,237.43
Crystal Springs Pump Aqueduct	1,651.60	721.25	1,491.47
Crystal Springs Transmission Line	26,128.26	9,109.02	7,987.46
San Andres Transmission Line No. 1	3,239.30	1,958.49	1,673.58
San Andres Transmission Line No. 2	1,699.92	2,475.53	3,045.91
San Andres Transmission Line M. B.	2,041.88	2,730.30	1,949.87
Niles Reservoir	1,783.93	3,216.76	2,298.81
Pleasanton Transmission Line	46.80	1,395.44	
Newark-San Lorenzo Pipe Line	1,129.39	2,531.88	2,052.89
	$ 45,833.88	$ 30,320.66	$ 28,408.23
MISCELLANEOUS EXPENSES AND GENERAL EXPENSES			
Alameda System Expense	$ 15,449.29	$ 15,911.20	$ 14,783.05
Outside Meter Expense	5,305.76	5,042.12	4,569.19
Telephone Account	4,650.43	6,210.38	8,417.09
Peninsula System Expense	33,402.55	41,647.92	35,730.65
General Expense	2,266.53	1,461.46	2,576.13
Engineering Dept. (Hydrography)	3,283.97	4,466.64	3,001.45
Rent and Land Expense (Operating Prop.)	949.53	13.23	
	$ 65,308.06	$ 74,752.95	$ 69,077.56
TOTAL	$774,032.51	$947,298.30	$560,915.33

TABLE NO. 9

Comparative Pumping Station Costs

BELMONT PUMPS	1929	1930-31	1931-32	1932-33
Water pumped gals.	5,793,408,580	5,993,956,807	6,066,392,332	5,839,966,473
Oil burned gals.	1,186,818			
Gas burned cu. ft.		139,270,747	133,230,262	128,044,683
Fuel Cost	$30,877.01	$22,283.33	$19,978.70	$18,932.93
Labor Cost	33,293.29	42,392.71	40,953.38	40,555.94
Miscellaneous	2,245.87	4,087.00	3,298.47	2,850.47
	$66,416.17	$68,763.04	$64,230.55	$62,339.34
Cost per mil. gal.	$11.47	$11.46	$10.58	$10.67
Cost per mil. gal. ft.	.0409	.0421	.0404	.0428

MILLBRAE PUMPS

Water pumped gals...	3,746,890,000	4,314,630,000	3,744,570,000	2,911,190,000
Oil burned gals..........	354,160			
Gas burned cu. ft.......		35,394,424	41,071,347	43,004,055
Elec. power KWH......	349,680	709,440	515,280	39,600
Fuel and power cost..	$13,442.91	$14,136.20	$11,832.06	$ 7,941.37
Labor cost	18,017.74	24,439.78	24,332.69	23,891.46
Miscellaneous	1,814.23	3,195.87	2,826.61	1,312.03
	$33,274.88	$41,771.85	$38,991.36	$33,144.86
Cost per mil. gal.........	$8.88	$9.68	$10.41	$11.384
Cost per mil. gal. ft...	.0788	.0785	.0842	.0842

CRYSTAL SPRINGS BOOSTER PUMP

Water pumped gals...	6,921,080,000	6,260,310,000	3,890,800,000	132,970,000
Elec. power KWH......		3,390,000	2,315,000	45,700
Power Cost	$20,830.00	$23,820.00	$17,670.71	$ 576.60
Labor Cost	3,331.50	3,778.26	4,670.00	340.00
Miscellaneous	599.94	448.86	661.79	145.55
	$24,761.44	$28,047.12	$23,002.50	$ 862.15
Cost per mil. gal.........	$3.378	$4.478	$5.917	$6.4838
Cost per mil. gal. ft...	.0859	.0812	.0926	.3050

SAN ANDRES PUMP

Water pumped gals...	4,885,370,000	5,366,540,000	2,476,760,000	4,769,800,000
Elec. power KWH......		5,906,000	2,554,300	4,899,900
Power Cost	$51,370.40	$41,438.74	$19,480.59	$40,379.42
Labor Cost	2,900.77	3,778.27	3,320.46	8,109.03
Miscellaneous	763.83	448.86	470.75	3,440.57
	$55,035.00	$45,665.87	$23,271.80	$51,929.02
Cost per mil. gal.........	$11.265	$8.510	$9.402	$10.887
Cost per mil. gal. ft...	.0440	.0303	.0305	.0441

PULGAS PUMPS

Water pumped gals...	2,805,610,000	7,305,380,000	10,476,062,000	10,934,550,000
Elec. power KWH......	1,904,000	5,699,200	9,553,600	10,033,600
Power Cost	$24,289.20	$45,547.92	$69,075.45	$71,080.10
Labor Cost	5,670.46	8,191.25	7,898.46	7,737.06
Miscellaneous	373.31	1,755.59	600.47	977.20
	$30,332.97	$55,494.76	$77,575.38	$79,794.36
Cost per mil. gal.........	$10.81	$7.60	$7.40	$7.30
Cost per mil. gal. ft...	.0762	.0443	.0362	.0360

Crystal Springs pumps handled considerably less water during the two years on account of not having the water to pump. Approximately six million gallons per day of water had been pumped from Sunset wells during the past two years, reducing this pumping demand. The Crystal Springs booster pump operated 237 days during 1931-32 and only a few days during 1932-33. After February 19, 1932, the elevation of Crystal Springs reservoir water surface was high enough so that the booster pumps did not have to be operated to supply the decreased University Mound District consumption, unless the Millbrae electric pump was not operating.

The San Andres pump operated through July, August and one-half of September, 1931, and was then closed down until April 5, 1932, on account of lack of water. Since that date this pump has operated continuously. The wire on the power line from Aqua to Crystal Springs pumps was changed from No. 6 solid copper wire to No. 4 stranded copper wire during 1932-33.

The Bay Division pumps operated continuously during the two years, pumping water received from San Lorenzo pumps during the first six months and from the Alameda sources during the remaining eighteen months. This station pumped more water during each of these two years than during any previous year except 1927. The unit operating costs were lower than any previous year except 1927. The increased total operating costs of the station over the previous year was due to the extra power required to pump the additional amount of water.

Water Purification:

The treatment of the water in the various storage reservoirs with copper sulphate and the application of chlorine to the water being used for consumption, were more economical and systematic than in previous years. This was possible on account of having a purification engineer devote more time exclusively to the purification work.

During the summer of 1931, Crystal Springs reservoir reached a very low level, occasioned by the very small runoff of the preceding winter. Wind action on this low level resulted in a very turbid condition of the water in the reservoir. Experiments with copper sulphate, chlorine and aluminum sulphate added directly to the reservoir during July failed to remove this turbid condition. On July 17, 1931, the coagulating plant at Millbrae was placed in operation, coagulating the water entering San Francisco through the Crystal Springs pipe line. This was effective in clarifying the University Mound water, and was continued in operation until November 6, when the Crystal Springs water cleared up with the rise of water in the reservoir. This coagulating plant has not operated since November 6, 1931. Normally, it is not necessary to operate the Millbrae coagulating plant, and this, together with the extra amount of chlorine necessary on account of the increased organic matter carried in the water, resulted in the 1931-32 expense of purification operations being considerably greater than in previous years.

A new solution vacuum type, Wallace & Tiernan, chlorinating machine was installed at Crystal Springs pumping plant during 1931-32, and a duplicate machine was installed during 1932-33. These solution type machines give more satisfactory operation than the dry feed type machine previously used.

The dry feed chlorinating machine, removed from Crystal Springs, was installed as a duplicate machine in the chlorinating plant at the Bald Hill outlet to San Andres reservoir. This Bald Hill plant is the only chlorinating plant in the system which has not been equipped to handle ton cylinders of chlorination. The cost of applying chlorine, using one-ton cylinders, is about half the cost of application using the smaller 150-pound cylinders.

Both the Sunol and Belmont chlorinating plants operated satisfactorily throughout the two years. The Belmont plant is the only one in the system that is not now equipped with a standby chlorinating machine.

There has been much trouble keeping the automatic dry feed type chlorinating machines at the North San Andres outlet in working order during the past two years. Only constant vigilance and a great deal of repair work have kept these machines in continuous operation. The addition of the dry chlorine gas directly into the transmission main has allowed, also, the chlorine gas to attack the metal of the pipe near the point of introduction, and this has caused a number of leaks. The replacement of these dry feed machines with solution feed machines is provided for in the 1933-34 budget.

The growth of moss in the Crystal Springs aqueduct, which has given considerable trouble during the past two years, has been kept down by the application of copper sulphate to the water. As soon as funds are available this canal should be roofed over, which would prevent the moss growth and eliminate any danger to children or animals from falling into the canal, and keep it free from leaves, twigs or other foreign matter.

All of the storage reservoirs maintained a relatively high level throughout 1932-33, tending to eliminate turbid water, but increasing the quantity of copper sulphate required for water treatments during the warm season in order to control taste due to the growth of microscopic organisms.

Water purification control has been facilitated by additional equipment installed at the Millbrae laboratory, making it now possible to have both chemical and bacteriological examinations of water samples.

Maintenance and Minor Construction:

Under this heading the more expensive and unusual work included the following:

1931-32

Painting of the Bay Division bridge, construction of fire trails along north, west and south boundaries of San Mateo County watershed property.

Replacement of fence along the west boundary of the Pilarcitos watershed.

The extension of the gauge board and ladder to measure the low water level of Crystal Springs reservoir.

Building of a foot-bridge with guard rail to permit outside access to the old forebay tower of Crystal Springs reservoir.

New horizontal screens were placed on both the lowest outlet to Crystal Springs reservoir and the outlet to Upper Crystal Springs reservoir. Both of these installations were made possible by the extreme low stages of these reservoirs.

The feeder flumes of Pilarcitos reservoir were completely overhauled.

Considerable road construction was necessitated on account of the heavy winter rains causing bad washouts on the Sawyer Camp road and on the main road leading to San Andres dam.

An unusually large number of leaks occurred in the Alameda pipe line south of Belmont, and also in Alameda County; this trouble continued through 1932-33. That portion of this pipe line north of Belmont gave less trouble during 1931-32 than usual, but leaks during 1932-33 were as frequent as ever.

A large number of leaks occuring in the new 54-inch San Andres pipe line during the year resulted in the undertaking of an extensive study of the matter, which is no doubt the result of electrolysis.

1932-33

The line fences between the Spring Valley Land Company and the east boundary of the city's Peninsula properties were built. The fences along the Skyline Boulevard and from the Belmont Hill to the south end of the property were painted. Fence repairs due to damage done by automobiles continued to increase.

The launch on Upper Crystal Springs reservoir was replaced with a new one, and the south end of this reservoir was cleared of brush and willows. The outside of the keeper's cottage was painted, as also the Upper Crystal Springs dam watchman's cottage.

The outside of the two keepers' houses and other buildings at San Andres were painted. A large amount of the shrubbery at San Andres cottage was killed by the heavy winter frost.

Many new culverts were installed along both of the roads leading to Pilarcitos reservoir. Several of the sharp turns and bad sections of these two roads were widened. Considerable brush along these roads was cut, but a very large amount of work is necessary to make these roads either reasonably good fire guards or safe for the present class of travel. The main fire guard around the exterior boundary of the Peninsula properties was plowed.

The trees and brush were cleared from a large portion of Calaveras reservoir site during 1916 and 1917. One-half of this cleared area had never been submerged with water prior to 1932, with the result that second growth brush and trees densely covered this unsubmerged half. Considerable work was done during the past year in slashing and burning the second growth. Very much more remains to be cleared and should be done during the next eighteen months, because with the Hetch Hetchy water available, Calaveras reservoir will be allowed to fill with water, and this large amount of submerged vegetation would make the water unpotable.

The ordinary maintenance and repair of transmission pipe lines and pipe line structures were continued throughout the year. Rust spots on the Bay bridge were cleaned and painted. The Baden gate house was rebuilt, giving more head room and better ventilation.

A section of the Crystal Springs pipe line is exposed where the county widened the county road below Crystal Springs dam. This pipe should be lowered to avoid possible damage. A section of the county road change below Crystal Springs dam was made by the Water Department to avoid the necessity of moving a portion of the Crystal Springs pipe line.

The electrolysis survey on the North San Andres pipe line was continued during this year. It was found that the electric current causing corrosion of the pipe was entirely stray current from electric railways in San Francisco and from the San Mateo branch of the Market Street Railway. Insulating joints were placed in the pipe line at Baden Junction and at the county line. The Baden joint was effective in reducing the electric current south of this point to one-tenth of its former quantity, but the county line insulation was not materially effective. The number of leaks occurring in this line was greatly reduced by these insulations.

A 22-inch pipe, one of the four force mains leading up the hill from San Andres pump to the Crystal Springs aqueduct, was moved at the county road crossing to different location to accommodate the reconstruction of the county road.

Newer sewer connections and a septic tank were installed at Millbrae for the Assistant Superintendent's and General Foreman's cottages. The roof of the Superintendent's cottage at Millbrae was repaired and covered with fire-resisting shingles. The outside of all the Millbrae outbuildings was painted.

Additions and Betterments:

The important water production construction projects chargeable to capital expenditures included:

Year 1931-32

1. Additional wells at Pleasanton.
2. New Crystal Springs outlet.
3. Replacing Crystal Springs pump flume with concrete lined canal.
4. The completion of Upper Alameda Creek tunnel and the construction of the diversion dam.

Year 1932-33

5. Crystal Springs aqueduct supply line.
6. Sawyer Camp keeper's cottage.
7. Protection work, Upper Alameda Creek dam and tunnel.
8. Drilling test wells on Calaveras dam.
9. Crystal Springs pump station extension.
10. Wire replacement on Millbrae-Crystal Springs power line.
11. Concrete siphon on Crystal Springs aqueduct.

Pleasanton Wells:

During the fall of 1931, two new gravel envelope wells, each about 400 feet deep, were constructed at Pleasanton for the Water Department supply. In addition, twelve of the previously constructed wells were deepened to a depth of approximately 400 feet. The equipment in these wells was lowered to a pump setting of 220 feet below ground surface and the motors replaced with motors of greater horsepower. Pumping the Pleasanton wells was discontinued on December 26, 1931, excepting wells which supply local consumption between the Pleasanton wells and the Town of Sunol, the abundance of flood water making this possible. From July, 1931, to December 26, 1931, these wells were delivering 15 million gallons daily, and at the time the pumping was discontinued the water was being lifted from 210 to 240 feet below ground surface. On December 26, 1931, the following well pumps were available for operation:

Four 80 horsepower pumps.
Three 75 horsepower pumps.
Ten 50 horsepower pumps.
One 20 horsepower pump.

Three 20 horsepower pumps were not operating on account of the low water table. These wells were operated for only local consumption during 1932-33.

On account of the lowering of the water table, the Water Department, under an agreement with the Pleasanton Township County Water District, was obliged in the fall of 1931 to construct a well on the property of Bush Bros. for domestic and irrigation supply for their property, which lies within the boundaries of that district.

Sunset Wells:

In addition to the well operations at Pleasanton, four new wells were also constructed during 1931-32 in the Sunset well area on 43rd and 44th Avenues, San Francisco. These four wells bring the total number of wells

NEW CRYSTAL SPRINGS AQUEDUCT

This replaces an old wooden flume and provides necessary additional capacity for transferring water from Crystal Springs Reservoir to San Andres Reservoir. View of 80 m. g. d. section at lower end a few days after completion, carrying storm flow into San Andres.

at the Sunset well field up to 20 wells, which produced an average of 5.8 million gallons daily during 1931-32 and 5.6 million gallons daily during 1932-33.

New Crystal Springs Outlet:

Due to the dry season Crystal Springs reservoir was drawn down to a level of 16 feet on the gauge. During the fall of 1931 advantage was taken of this very low water level to start the construction of a new outlet for Crystal Springs reservoir. This new outlet will be required within the next few years on account of the increasing draft on the reservoir.

Crystal Springs Aqueduct:

The Crystal Springs pump flume was removed and replaced by a concrete lined canal during the fall of 1931. The canal is 5.8 miles in length and has capacity for delivering 60 million gallons daily from Crystal Springs reservoir into San Andres reservoir, as against 18 million gallons daily capacity of the old flume. From the junction with the Stone dam aqueduct northerly, a distance of two miles, the capacity of the canal is 80 million gallons daily to take care of the additional flow from this aqueduct.

During the fall of 1932 a supply pipe was constructed from the Crystal Springs pump station, at the bottom of Crystal Springs dam, up the side of Howard Hill, to the beginning of the canal. This supply pipe is partly 48 inches and partly 54 inches diameter and is 1408 feet long, and its conjunction with the four smaller supply pipes previously used provides an economical

CRYSTAL SPRINGS PUMP STATION EXTENSION UNDER CONSTRUCTION capacity of 60 million gallons per day. These pipe lines are referred to as the Crystal Springs aqueduct supply pipes.

Concrete Siphon:

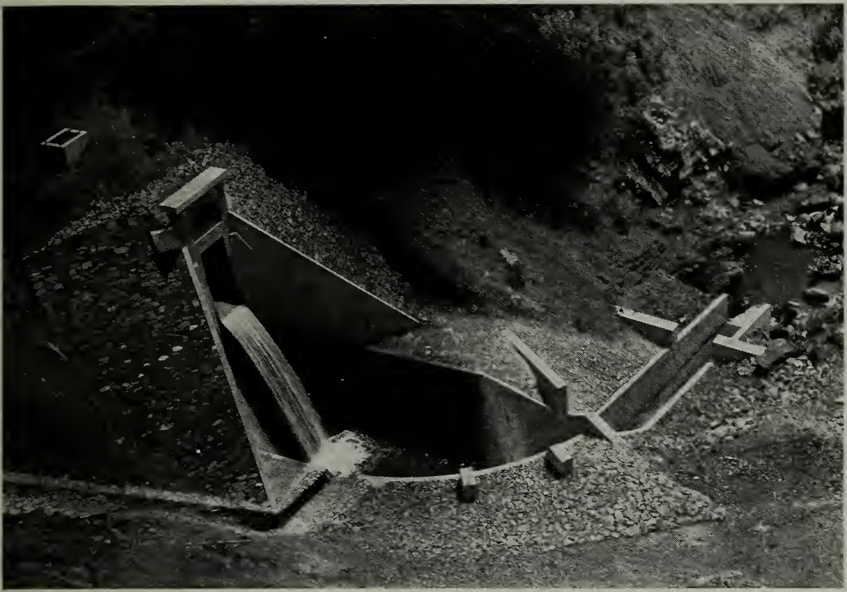
In June, 1933, a contract was let for a 72-inch diameter concrete siphon to carry the water from the north end of the canal near the San Andres guest cottage across the gulch and empty into San Andres reservoir. This concrete siphon will replace the old wooden trestle and chute now discharging into San Andres.

Crystal Springs Pump Station Extension:

Also, in June, 1933, a contract was let for an addition to the Crystal Springs pump station, consisting of an extension to the building and the installation of two new centrifugal pumping units to pump water from Crystal Springs reservoir through the Crystal Springs supply pipe into the south end of Crystal Springs aqueduct, from which point the water runs by gravity through the canal and concrete siphon into San Andres reservoir. These two new pumps, together with one already installed, are known as the "San Andres pumps." Of the new pumps is one originally purchased for use with the Corral Hollow pipe line. It has been equipped with a new runner designed for the Crystal Springs pumping conditions and is driven with a 2200 volt 700 horsepower synchronous motor originally installed in the San Lorenzo pumping plant. The second pump was purchased new for this installation. It is driven by a 2200 volt 1000 horsepower synchronous motor originally purchased for the Corral Hollow installation. The three San Andres pumps will lift a total of 60 million gallons per day from Crystal Springs reservoir up to the canal. The old San Andres pump and the two 500 horsepower motors driving it are very inefficient for operation under future conditions and should be replaced by modern equipment whenever increase in consumption requires extended operation of this unit, which will be held, in the meantime, as a spare.

Upper Alameda Creek Tunnel and Diversion Dam:

The fall of 1931 saw the completion of the Upper Alameda Creek tunnel and diversion dam. The diversion of the 1931-32 flood waters through this tunnel into Calaveras reservoir was the culmination of another of the late Herman Schussler's plans for San Francisco's water supply. Herman Schussler and his early associate in the development of the Spring Valley Water Works, Mr. W. H. Lawrence, Sr., first located the Calaveras reservoir site in 1864. Upon the advice of these gentlemen, the Spring Valley Water Works started acquiring Calaveras property in 1875. All the arrangements were completed for the start of the construction of Calaveras dam in 1906, but the fire of that year eliminated the plans as well as the immediate necessity. Calaveras dam as completed in 1925 created a reservoir with a watershed of 100 square miles tributary thereto. With the completion of the Upper Alameda Creek tunnel and diversion work, 82 per cent of the flood waters of an additional 35 square miles of watershed can be diverted



WEST PORTAL OF UPPER ALAMEDA CREEK TUNNEL AS COMPLETED

into Calaveras reservoir. The water productivity of this 135 square miles of watershed may be more easily appreciated when it is realized that all the Spring Valley lakes down the Peninsula have only 36 square miles of tributary watershed. The tunnel and diversion dam job was completed and the first flood waters diverted through the tunnel December 23, 1931.

The tunnel has a capacity of 420 million gallons per day. During the 1931-32 season it diverted approximately 5 billion gallons of flood water into Calaveras reservoir. During the past year, this quantity of water sold in San Francisco for $1,780,000. The total cost of the Upper Alameda Creek tunnel and diversion dam was $1,058,000.

Upper Alameda Creek Dam and Tunnel Protection Work:

The flood waters of 1931-32 passing over the Upper Alameda Creek diversion dam indicated that very large floods would erode the stream bed at its junction with the downstream apron of the dam. To obviate the possibility of damage to the dam from such erosion, the apron was extended an additional 70 feet downstream during the fall of 1932. The floods of 1932-33 indicated that this additional protection was adequate.

The flood waters of 1931-32 eroded a deep gorge between the outlet end of Upper Alameda Creek tunnel and the low water surface in Calaveras reservoir. During the fall of 1932 a stilling basin and chute was constructed in this gorge. It is probable that within four or five years it will be found desirable to extend this chute further down the gorge to low water elevation of the reservoir.

CITY DISTRIBUTION DIVISION

Water Consumption:

The water consumed in San Francisco for the year 1931-32 was slightly more than the preceding year, the gain, however, being only three-tenths of 1 per cent. University Mound district, the industrial area, lost 6 per cent in the year, and Forest Hill district, the newest residential district, 2.9 per cent. The three main residential areas showed an increase in consumption: Stanford Heights, seven-tenths of 1 per cent; Lake Honda, 5 per cent, and College Hill, 5 per cent.

It is difficult to assign any specific cause for the decrease in the Forest Hill area nor for the rather considerable gain of 5 per cent in the Lake Honda and College Hill areas, except that the latter two districts probably absorbed most of the population increase. The University Mound district suffered with the general loss in commercial and industrial activities.

The year 1932-33 showed a more pronounced decrease than the previous year. Forest Hill continued to lose, 1.7 per cent; Lake Honda, 1.9 per cent; College Hill, 4.8 per cent, and University Mound, 13 per cent. Stanford Heights district was the only one to gain, and that only seven-tenths of 1 per cent. The total consumption for the entire city showed a loss of just 6 per cent.

The consumption for the past three years, together with the percentage gain or loss, is given in the following table:

AVERAGE DAILY CONSUMPTION GALLONS AND PERCENTAGE CHANGE FROM PREVIOUS YEAR

	1930-1931		1931-1932		1932-1933	
DISTRICT	Cons'mpt'n Gallons	% Change	Cons'mpt'n Gallons	% Change	Cons'mpt'n Gallons	% Change
Forest Hill	243,413	— 8.5	236,329	— 2.9	232,333	— 1.7
Stanford	5,406,043	— 6.3	5,441,768	+ 0.7	5,478,132	+ 0.7
Lake Honda	19,075,335	+11.0	20,034,203	+ 5.0	19,650,216	— 1.9
College Hill	5,838,586	— 1.7	6,131,448	+ 5.0	5,834,751	— 4.8
Univ. Mound	18,624,518	— 6.0	17,506,610	— 6.0	15,224,262	—13.0
Total City	49,187,895	+ 0.4	49,350,358	+ 0.3	46,419,694	— 6.0
Suburban	3,078,698	— 8.5	2,767,462	—10.1	2,736,964	— 1.1
Total	52,266,593	— 0.2	52,117,820	— 0.3	49,156,658	— 5.8

PEAK CONSUMPTION

DISTRICT	1932-33	1931-32	1930-31
Forest Hill	440,618	313,642	401,000
Stanford Heights	6,659,000	6,679,000	7,988,000
Lake Honda	24,105,354	23,472,496	24,636,759
College Hill	6,626,000	6,794,000	6,936,000
University Mound	18,270,000	22,066,500	22,189,000
TOTAL CITY	55,314,000	59,325,638	62,027,759
Suburban	6,331,000	8,254,000	8,317,000
Total Entire System	60,378,000	67,579,638	70,344,759

Operating Expenses:

The operating expenses of the City Distributing Division for the last several years, segregated into the various accounts, are:

CITY PIPE SYSTEM AND RESERVOIRS

	1932-1933	1931-1932	1930-1931
Lake Merced Purification	$ 315.53	$ 3,573.89	$ 4,005.29
Lake Honda Purification	7,269.25	7,163.87	6,862.79
Lake Merced Purification	7,445.88	6,337.97	4,645.82
Central Pumps S. Line			
San Andres Trans. Line		936.82	233.49
City Pumps Supply Line	63.00	52.27	121.75
San Andres T. Line No. 2		2.10	9.10
S. A. T. Line Merced Branch		181.36	194.15
Crystal Springs T. L.		3,012.13	213.03
Lake Honda Trans. Line		3,473.14	65.46
City Reservoirs	13,579.03	15,869.66	10,869.11
Meter Expense	44,101.57	41,831.16	42,593.82
St. Dept. Expense	13,044.93	12,736.26	11,961.49
Main Repairs	27,103.23	57,285.94	51,934.42
Service Connection Rep.	72,978.75	64,781.69	64,225.65
City Dis. Div. General	14,074.99	47,232.02	44,812.88
Leland Ave. Purification		125.49	
Sunset Purification	498.37	560.07	373.20
Sunset Pump Supp. Line	28.87		76.92
Sunset Force Main		716.28	547.41
Sunset Force	947.45	1,007.55	511.63
Daly Hill Pump Supply Line	5.71		135.37
College Hill Screen System	307.00		
University Mound Purification	124.35		
C. D. D. Purification, General	73.62		
*Superintendence	32,261.70		
Repairs Trans. Lines	3,705.33		
Total Operating Expense	$237,928.56	$266,879.67	$244,387.83

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* C. D. D. General Account divided into C. D. D. General and Superintendence.

PUMPING STATIONS

STEAM PUMPS	1932-1933	1931-1932	1930-1931
Central	$ 39,502.53	$ 40,196.36	$ 42,608.51
City	42,729.24	43,546.48	45,285.58
Black Point	1,357.32	864.53	974.42
Clarendon Heights	688.70	358.47	391.68
Ocean View	93.18	63.00	84.94
	$ 84,370.97	$ 85,028.84	$ 89,345.13
ELECTRIC PUMPS			
Precita Valley	$ 450.23	$ 4,522.49	$ 3,989.71
Forest Hill	4,724.95	4,448.57	3,917.33
Potrero Heights	217.96	292.16	204.27
Newcomb Avenue	620.42	582.99	667.27
Hillside	440.74	383.09	634.75
Fairview	244.00	140.05	247.50
Lincoln Park	343.44	256.56	330.79
Crocker Amazon	272.69	377.82	397.26
Daly Hill	785.72	2,184.16	2,677.68
Twin Peaks	272.52	296.53	331.09
Lake Honda Booster	2,054.43	2,976.29	2,771.80
University Pump	291.90	278.32	201.13
Leland Avenue	95.52	4,995.09	9,452.17
Sunset Booster	35,857.49	36,187.55	24,077.17
Sunset Source	18,529.02	18,448.18	15,732.85
	$ 65,201.03	$ 76,369.85	$ 65,632.77
All Stations Total	$149,572.00	$161,398.69	$154,977.90

A comparison of operating expenditures of the past four years, segregated as to labor, material, fuel, etc., follows:

CITY PIPE SYSTEM AND RESERVOIRS

	Jan.-June 1930	1930-1931	1931-1932	1932-1933
Labor	$ 69,752.27	$161,918.34	$181,253.24	$163,830.52
Material	17,122.91	39,320.36	45,451.67	33,336.76
Teaming	3,540.75	11,870.35	12,771.21	13,599.33
Compressor	1,366.78	3,105.83	5,247.07	3,990.95
Paving	8,661.45	19,161.15	14,917.16	14,226.79
Miscellaneous	7,992.49	9,011.80	7,239.32	8,944.21
Total	$108,436.65	$244,387.83	$266,879.67	$237,928.56

PUMPING STATIONS

	Jan.-June 1930	1930-1931	1931-1932	1932-1933
Labor	$ 29,407.82	$ 72,742.42	$ 72,654.73	$ 67,498.35
Material and Misc.	2,199.45	5,376.98	5,147.86	5,324.92
Teaming	250.75	826.38	435.59	638.79
Fuel, Oil, Power	21,273.59	73,597.09	80,174.81	74,113.93
Machine Shop	1,044.93	2,435.03	2,985.70	1,996.01
	$ 54,176.54	$154,977.90*	$161,398.69**	$149,572.00**
GRAND TOTAL	$162,613.19	$399,365.73	$428,278.36	$387,500.56
Cost per M. G.	18.44	21.98	23.71	22.87

Total water used in San Francisco 1931-1932—18,062,230,820 gallons.
Total water used in San Francisco 1932-1933—16,941,424,000 gallons.

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* Includes $39,810 pumping expense for Sunset Wells placed in operation October, 1930.

** Includes $54,386.51 pumping expense for Sunset Wells in 1932-33 and $54,635 for 1931-32.

Pumping Stations:

The Central and Lake Merced pumping stations have been operated throughout both fiscal years. The Central pumping station is in fine shape. The Lake Merced plant is in good shape, considering the fact that it is 42 years old.

The turbines in Central pumps were examined in January, 1932, and were found in excellent condition after three years' operation of the plant. Each turbine operates about one-half of the time.

The Lake Merced pumps were given the usual thorough overhauling in March, 1932. In March, 1933, only such work was done to them as seemed necessary to keep them in good running order for the balance of the year, after which it is expected to discontinue regular operation of this plant. They were shut down for overhauling on March 7 and again started at 11 A. M., April 4, 1933.

The Sunset pumps were run at maximum capacity during both years, pumping a daily average of 5,780,380 gallons in 1931-32, and 5,604,044 gallons in 1932-33. The water was of good quality, no complaint of water from the source being received during the year.

All wells are still being pumped at the rate first set, varying from 170 to 280 gallons per minute, depending upon the capacity of the pumps, except Well No. 4, which has yielded only 70 gallons per minute.

March 4, 1931, a contract was awarded to J. B. Rogers for the drilling of four new wells, three on 43rd Avenue and the fourth on 44th Avenue south of Santiago Street. This work was completed and accepted on September 22, 1931. The machinery was installed, and the last well put under production on October 15, 1931. A test well was put down on 46th Avenue north of Ortega Street to enable the department to measure and record the ground water level removed from the influence of the draw down in the wells and also to anticipate any intrusion of salinity from the sea into the fresh water body tapped by the main wells. This well is 200 feet deep. Since its completion on June 28, 1931, the water level in this well has varied from 48 feet below street level on that date to 56 feet 11 inches at the present time. The salinity of the water has shown no increase up to the present time.

The operation of the main station and deep well pump has been very satisfactory.

The raw water has been of a very high standard as regards contamination, but as a precautionary measure has been continuously given a small chlorine treatment.

The small pumps located about the city have in general been run throughout the year. When the use of Lake Merced water was discontinued in March, 1932, the Daly Hill pumps, one of which had been kept in continuous operation to dilute the Merced water, were shut down, and since then have been run only when some emergency has made it necessary to shut down one or both of the Lake Merced pumps.

In the fall of 1932 the No. 1 pump at the Forest Hill station started giving trouble with vibration, causing considerable annoyance to the consumers on the line. The difficulty was finally traced to the gear shaft, which had sprung out of line, and the disturbance was eliminated by rectifying the condition.

The Leland Avenue pumps were shut down on March 1, 1931, as the water storage accumulated in the reservoirs during the winter made it inadvisable to use this expensive water of questionable quality. The Leland Avenue district is now being supplied from the Daly Hill district, the Wilde Avenue reservoir being retained as local storage for the district.

At the time that the plant was shut down it was thought that it would not be necessary to again run these pumps. However, on April 4, 1933, when the Daly Hill supply failed to furnish enough water, it became necessary to again operate them for a few days.

When the rearrangement of the Daly Hill supply system is made, shutting down Lake Merced pump, a small unit will be put in with the University pump to augment the flow into the Wilde Avenue reservoir as it becomes necessary.

Neither the Precita Valley nor the Lake Honda booster plant was run during the year. On April 5, 1933, the electric standby service for the Lake Honda booster pump was discontinued, but service will be available within twenty-four hours if it should become necessary to start the pump. This will effect a saving of $225.00 monthly.

During the first half of 1933 the buildings at Lake Merced, Black Point, Precita Valley and Clarendon Heights pumps were painted by the forces of the Department of Public Works.

The Black Point and Clarendon Heights pumps were not operated.

The operating costs of the steam pumping stations are as follows:

STEAM PUMPING STATION COSTS

	Jan-June-1930	1930-1931	1931-1932	1932-1933
Water Pumped, Gals.	2,144,006,040	4,353,733,640	4,298,130,360	4,557,032,280
Gas Burned, Cu. Ft.	665,698	*	169,363,069	170,220,963
Fuel Cost	$ 16,079.64	$ 27,234.81	$ 24,709.43	$ 24,418.31
Labor—Operating	24,250.00	51,180.00	52,858.78	53,170.33
Labor—Extra	2,462.64	5,105.71	2,417.06	2,070.59
Miscellaneous	2,836.01	5,824.61	5,043.57	4,711.74
Total	$ 45,628.29	$ 89,345.13	$ 85,028.84	$ 84,370.97
Cost per M. G.	$ 21.28	$ 20.52	$ 19.78	$ 18.53

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* 413,511 gallons of oil and 99,978,563 cubic feet of gas.

Lake Merced Purification:

The Lake Merced filters were operated until March 8, 1932, when the use of Lake Merced water was discontinued. They were then cleaned and new sand placed ready for use. They have not been used since that date.

While the Lake Merced water was used it was coagulated, filtered and chlorinated. In addition to the chlorine, ammonium sulphate was added to the water, beginning at 11 A. M., July 28, 1931, and continuing until March 8, 1932. By dilution of the Lake Merced water in the ratio of two parts of San Andres to one part of Lake Merced water, the bad water complaints in the Daly Hill district were kept to a minimum.

Screen House:

The Lake Honda screen house has been operated continuously during the past two years. It is in reasonably good shape. It was painted in the spring of this year.

The old University Mound screen house, abandoned long since, was torn down by a crew of the "unemployed." It was of no value and had become a menace and an eye sore.

Lake Merced:

The shortage of water made it necessary to draw steadily from Lake Merced up to its full yield until the spring of 1932, when our Peninsula storage was sufficient to permit us to discontinue the use of Lake Merced water. This water caused considerable complaint which, during the past several years, has only been kept within bounds by the dilution of the Merced water with twice as much San Andres water.

By March 1, 1932, the level of the south lake had gone down to a gauge height of 9 feet 8¾ inches, with a storage of 679,678,000 gallons. At that time it was decided to discontinue drawing water from Lake Merced until such time as it might again become necessary. The draft was stopped on March 8, 1932.

From that date until a year later, March 8, 1933, the lake rose only 6 feet 2 inches, an increase in storage of 406,010,000 gallons, which gives the lake an average daily yield for the year of only 1,112,000 gallons. The normal yield of the lake was very approximately 3 million gallons daily. It would appear that the draft from the Sunset wells is affecting the Lake Merced supply.

When use of Lake Merced water was discontinued it was expected that the lake would fill in two years, raising from a gauge height of 9 feet 8¾ inches to 30 feet.

The lake shores were cleared of brush by two crews of the "unemployed" in expectation of the rise in level of the lake. Most of this work was lost, as the failure of the water to rise permitted a regrowth of the vegetation around the unflooded rim of the lake. This clearing work was discontinued on April 1, 1933, to be started again when the rise in the lake makes it advisable.

At the request of the Audubon Association of the Pacific the natural growth of tule and brush at the south end of the lake, beyond the telephone line crossing, was left to provide a natural breeding place for the wild birds.

The Pacific Association of Amateur Oarsmen held a regatta on the lake June 18, 1932, and again July 4, 1932. Permission for this use was granted under strict police regulations and in view of the fact that the lake was not at the time being used as a source of water supply.

Under permit from the Public Utilities Commission, considerable work has been done by the Department of Public Works in the development of a boulevard system around the lake, and in the construction of a parking field on the north shore of the north lake, and a footway across the north lake to the Harding Park club house.

Supply and Transmission Lines:

No serious trouble has been had with those portions of the transmission lines within the City Distributing Division. In July, 1932, street grading operations necessitated the lowering of about 300 feet of the Lake Honda transmission line in DeLong Street from Head Street easterly and in the crossing of DeLong and Head Streets.

A fill made to bring Woolsey Street to grade caused six leaks in the Crystal Springs transmission line at that point. These leaks occurred in February, 1932.

On February 7, 1933, a rivet seam pulled in the Lake Honda transmission line in Head, about 20 feet south of DeLong Street, causing a leak at that point which was repaired with a lead sleeve.

City Reservoirs:

No major changes were made in the city reservoirs. The usual maintenance work was done. The work on each reservoir was as follows:

The College Hill reservoir was cleaned from September 17 to October 15, 1932. Last fall considerable trouble was had with seagulls at this reservoir, and on December 10, 1932, a chlorinator was put in the outlet forebay; the water being chlorinated until January 25, 1933. On April 4, 1933, the chlorinator was taken away to the tunnel portal at Irvington. To keep the seagulls away additional wires were strung over the reservoir, making them in 25-foot squares. This work was done on December 24, 1933. It resulted in keeping the gulls away and eliminating the B. Coli pollution which had been traced to the gulls.

The contract for street work on the Hyde Street frontage of the Francisco reservoir was let on November 4, 1931. This work required the placing of several large posts within the reservoir. To permit this the water was, for a time, carried in the south basin. When the water was again put in the north basin, in April, 1932, the divide wall leaked rather badly, the water leaking through, undermining it for about 100 feet. The damaged portions were cleaned out and filled with concrete; the old redwood expansion joints were taken out and neat dry cement caulked in their place. This stopped most of the leakage. Bentonite was used, being spread on the reservoir bottom and then stirred daily in the hope that it would fill the remaining small cracks, which it did, to a large extent, though a small leakage still remains. When the north basin was emptied, for the first time since 1919, it was found that from 3 to 12 inches of fine sediment had been deposited on the floor. This was cleaned out before the reservoir was put back into service.

The Lombard Street reservoir was cleaned from November 8 to 11, 1932. Since 1906 this reservoir has been cleaned every nine years: in February, 1915; February, 1924, and November, 1932. From 6 to 12 inches of sediment was found on the bottom.

A retaining wall was built along the Hyde Street frontage of the Lombard reservoir, and a 4-foot sidewalk built between the wall and the curb. This was a contract job, the work being done in April, 1932.

A tar and gravel roof was put on the Potrero Heights reservoir, under contract, to protect the reservoir from growth and pollution. The Carolina Street frontage was graded in 1932, necessitating the grading of a new runway up to the reservoir, and a set of temporary steps to the keeper's house. The "unemployed" gangs did quite a little work in clearing the banks on the Wisconsin Street side.

The work of building the roadway along the south side of the Lake Honda reservoir is still in progress, so that the place has an unkempt appearance. As soon as this work is completed the fences should be rebuilt and the keeper's house raised to the new grade.

The repairs to the Wilde Avenue reservoir, necessary on account of leakage and which repairs were under way when the last report was written, have been completed and the reservoir is now tight.

At the University Mound reservoir the expansion of the gunite lining on the upper 6 feet caused it to crack in several places. These places were broken out and expansion joints installed so as to eliminate further trouble. The outlet gate at this reservoir again cracked, the first crack having come several years ago. A careful examination showed that it would be impracticable to repair the gate, so it was cut out and a 36-inch Chapman valve put in its place. This work was done during the year 1931-32. The street work on the Hamilton Street frontage, and some work on Felton Street, was done during the same year at a cost of $6,899.39.

The other tanks and reservoirs are in good shape, such small maintenance work as was necessary being done from time to time.

In July, 1932, the Parker Avenue and Fulton Street lot, bought for a tank site but never used, was sold.

The keepers' houses at the College Hill, University Mound, Francisco Street and Potrero Heights reservoirs were painted in the spring of 1933. The Forest Hill, Clarendon Heights and Presidio Heights tanks were also painted.

A number of lots in the blocks adjacent to University Mound reservoir, which lots the city had purchased as a part of a proposed park development, were acquired by the department during the last year at a cost of $24,125.00. These lots were within the site of the proposed new basin of the University Mound reservoir.

Meter Expense:

This is a routine account covering a great number of small repair jobs necessary to keep the meters in proper operating condition. Besides the shop and field work on the meters, it includes setting them back to new curb lines and such work as is a part of street improvements. During the year 1931-32, 4635 meters were changed and 716 brought home. In 1932-33 there were 4438 changed and 1007 taken home.

Meter Account:

In the year 1931-32, 2172 meters were set, 227 less than the previous year. Of the total set 1943 were ⅝-inch; 6, ¾-inch; 46, 1-inch; 34, 1½-inch, and 130, 2-inch. Besides these there were 9, 6-inch, and 4, 8-inch, fire meters installed. In the year 1932-33, 1148 were set.

AVERAGE COST PER METER

	1928	1929	Jan.-June 1930	1930-'31	1931-'32	1932-'33
Meters set	3814	2600	1063	2399	2172	1148
Percent. ⅝ & ¾	84.6	81.4	80.2	88.2	89.9	87.7
Labor	$ 0.93	$ 1.03	$ 1.37	$ 1.18	$ 1.23	$ 2.21
Supervision	.21	.30	.40	.41	.41	......
Meter	12.20	13.95	14.81	12.01	11.31	12.04
Material	1.87	2.46	4.74	2.15	.48	2.41
Teaming	.14	.16	.19	.25	.22	.45
Paving	.37	.48	.51	.49	.35	.35
Miscellaneous	.27	.40	.37	.21	.27	.18
TOTAL	$ 15.99	$ 18.78	$ 22.39	$ 16.70	$ 14.27	$ 17.65

City Pipe System:

The outstanding feature of the city pipe system development was the completion of Section A of the new University Mound main distributing line. This line is 11,504 feet long and 48 inches in diameter, running from the reservoir to 25th Street and Potrero Avenue. In addition a 36-inch connecting line, 1404 feet long, was laid in 25th Street from the 48-inch in Potrero Avenue to the 37-inch at 25th and Alabama Streets. This line was put into service October, 1931. The work cost $227,140.95.

In the extension of the secondary feeder main system, five contracts were prepared calling for the laying of approximately 23,760 feet of 16-inch and 10,300 feet of 12-inch cast iron pipe.

A contract for the laying of 1970 feet of 8-inch cast iron pipe in Jefferson Street was awarded to J. O'Shea on August 8, 1932, and another for the laying of 2000 feet of 8-inch cast iron pipe in Army Street to the Water Department on September 19, 1932. The data regarding the contracts is given elsewhere in connection with other contracts let during the period.

The usual amount of smaller cast iron pipe was laid. The pipe statistics for the year are given in a table following.

On July 1, 1933, the practice of sterilizing all mains before they are put into service was started. This is done by placing the necessary amount of hypochloride of lime in the pipe.

Capital expenditures to this account during the past three years are as follows:

	1932-1933	1931-1932	1930-1931
Service Connections	$ 13,093.65	$ 32,411.15	$ 38,826.51
Meter Account	8,259.05	25,529.93	30,007.63
Hydrant Account	....	7,941.51	9,078.52
City Distribution Mains	208,900.48	192,537.11	244,441.63
University Md. Pipe Line	....	222,070.68	....
University Md. Reservoir	*24,125.00	6,899.39	....
Wilde Avenue Reservoir	....	502.10	....
Lombard St. Reservoir	....	1,995.80	....
Potrero Hts. Reservoir Roof	....	2,366.46	....
Shop Equipment	....	11,085.74	....
Sunset Pumps	....	5,166.58	160,135.82
Lake Honda Screen House	....	....	1,200.00
Trestle Univ. Md. Pipe Line	....	....	4,426.95
Francisco St. Reservoir	**7,749.23	....	....
Lombard St. Reservoir	80.47	....	....
Potrero Hts. Reservoir	8.28	....	....
	$262,216.16	$508,506.45	$488,117.06

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* Purchase of Land. ** Street Work.

Equipment:

In 1931-32 we were able to add to our equipment a Cleveland ditching machine, capable of digging a ditch up to 5½ feet deep and 2 feet wide. This size covers almost all of the work done by the department. The machine has been used effectively and would be more effective if it could be kept digging more nearly continuously.

A 400 ampere Westinghouse electric welding machine was also purchased which has been a great help in our work throughout the system.

As an experiment a one-gun capacity air compressor was mounted on a Ford truck and arranged so as to be driven by the Ford engine. This truck was used on downtown repair work where previously we had sent a Ford truck and one of the regular air compressors with its crew of three men, usually having to take it off of its regular job. The little compressor has proven very effective, being ample for the work it has to do and making air power available all the time without any additional expense, as it is operated by the regular crew. A second machine was similarly equipped in April, 1933, for use in night work.

A shaper was added to the machine shop equipment.

COMPARATIVE COSTS OF METER MAINTENANCE FOR PAST FIVE YEARS

Year	Meters in Use	Total Cost	Cost per Meter	Labor Cost Per Meter	Material Cost Per Meter
1927	100,283	$43,130.29	.43	.205	.171
1928	107,743	40,965.09	.38	.189	.129
1929	109,611	42,035.04	.37	.194	.119
Jan.-June 1930	111,540	21,190.30	.19	.103	.069
1930-1931	113,027	42,593.82	.38	.211	.124
1931-1932	114,441	41,831.16	.37	.216	.116
1932-1933	---------	-----------	----	-----	-----

Street Department Expense:

This is a routine account that takes care of the blowing off and other miscellaneous work done by the gatemen. Dirty water complaints as well as complaints of bad taste were quite numerous both years. An additional gateman was put on, beginning with April 17, 1933.

Repairs Distribution Mains:

Aside from the work on the 16-inch main in Army, Iowa and Indiana Streets, which is detailed further on in this report, the repairs to distribution mains assumed only a routine aspect. Nothing new developed, either in the character or extent of the breaks, or in the method of handling them.

Service Connection Repairs:

Another routine account that has no outstanding features, but one that must be carried on constantly during the years.

Service Connection:

The lack of new buildings is reflected in this account. The detailed costs are given below.

	1928	1929	Jan.-June 1930	1930-'31	1931-'32	1932-'33
Services installed	2587	1705	729	1694	1559	708
Per Cent ¾ or smaller	87.9	83.0	85.2	91.4	93.0	90.8
Labor	$ 5.74	$ 7.34	$ 10.06	$ 8.79	$ 8.06	$ 9.23
Supervision	.43	.65	.56	.58	.25	-------
Compressor	.65	1.00	1.14	.96	.87	.95
Material	5.16	6.64	7.21	5.98	5.87	3.42
Teaming	0.62	.78	.88	.96	.94	1.33
Miscellaneous	2.18	2.22	4.00	1.52	0.99	1.78
Paving	3.23	4.65	4.75	4.12	3.80	1.78
TOTAL	$ 18.01	$ 23.28	$ 28.60	$ 22.92	$ 20.78	$ 18.49

Report of the National Board of Fire Underwriters:

During the year 1932 the National Board of Fire Underwriters made an examination of and report on our system. While they speak highly of the personnel and general operating methods, they call attention to the lack of pipe adequate to furnish fire protection (Page 16) and the excessive drop in pressures (Pressures, Page 20). They also comment on the fact that we have no program for the replacement of the 2-inch pipe (Page 20) and that outside of the area protected by the high pressure system only 12 out of 43 groups of hydrants tested gave adequate fire protection. Another of their comments is that "The system of secondary feeders is good in the central part of the University Mound service, but is incomplete or entirely lacking in many other parts of the city." (Page 20.)

Another thing to which they call attention is that "The system is poorly provided with gate valves." They recommend the installation of a number of secondary feeder mains at a cost of $999,440.00.

It is very necessary that a reasonable program of main extensions and reservoir construction be scheduled that will put the distributing system into acceptable shape.

Breakage of 12-Inch and 16-Inch Cast Iron Pipe:

Just prior to the city taking possession of the water supply system from the Spring Valley Company, that company had undertaken the work of laying a line of 16-inch cast iron pipe from Army and Alabama Streets, through the Potrero district to Indiana and Mariposa Streets, and a connected 12-inch cast iron pipe line in 22nd Street from Indiana to Third Street. This work was still in progress on March 3rd when the title passed, and the work was completed by the same crew under the new department and placed in service about a week later. All pipe was Class 150 centrifugally cast pipe. It was laid with Mineralead joints in a machine dug trench, approximately 4 feet deep, all in accordance with the standard practice of the Spring Valley Company, which may be considered as representative of the best practice for laying cast iron pipe throughout the United States. The pipe line was supplied with water from University Mound reservoir, whose overflow is 172 feet above City Base; the elevation of the pipe as laid varied from elevation —1 to +46, giving a maximum static pressure of 75 lbs. per square inch at the lowest point to approximately 55 lbs. at the highest point of the line.

The line was put in service on March 10, 1930, without any trouble being experienced. On July 9, 1930, at about 2 A. M., four months after the line had been in service, a length of pipe split and broke, at 22nd and Indiana Streets, causing considerable damage. The broken pipe was replaced with a new length and the line restored to service the same day. No further trouble developed until December 14, 1930, when a second length broke in a similar manner. Between that date and June 7, 1931, six more breaks occurred, all breaks being similar in nature. In response to our request, the manufacturer sent a technical representative to investigate the trouble, with a view to ascertain the cause and to advise what steps should be taken to prevent further breakage. After making a study of the conditions he concluded that the trouble was due to some of the pipe sections having been cracked in handling, during transit between the factory and the job. He recommended that the line be subjected to a test at a higher pressure for a period of time, with a view to eliminate any remaining cracked pipe. The line was connected to Lake Honda, pressure ranging from 125 to 150 lbs. This developed several more breaks in the line, between June 18 and June 25, 1931, each being repaired as it occurred and the pressure being reapplied. After the break of June 25, the line remained under Lake Honda pressure for 15 days without further breakage. On July 10 the line was returned to normal service under University Mound pressure. One week later, on July 17, the 15th break occurred; on August 15, the 16th, and on August 22 the 17th break took place. The line was put back on Lake Honda pressure and 4 more breaks developed, on August 26, September 2, 14 and 23. On the advice of the representative of the pipe company the line was divided into 4 sections, each of which in turn was subjected to an increased test pressure of 200 lbs. per square inch. After 12 more breaks, 8 occurring under 200 lbs. pressure, 1 under Lake Honda and 3 under University Mound pressure, each section was maintained intact at 200 lbs. pressure under 2 test periods of 8 hours each. The line was again returned to service, and from November 18, 1931, to April 5, 1932, 20 more breaks occurred, making a total of 54 in all. After the 50th break the department concluded that it was futile to attempt any further repairs, and the line was taken out of service as the further breaks developed in each section.

Only one break occurred in 835 feet of 12-inch line in 22nd Street, which was laid at the same time as the 16-inch line above described.

Fourteen breaks have occurred up to August 23, 1933, in the 12- and 16-inch line between the Sunset wells and the receiving tank. These for the most part have been splits repaired by banding, the line at this time being under about 10 lbs. pressure.

Claim was made against the pipe manufacturer to cover the cost of the defective pipe line and incidental expense involved, and after extended negotions the pipe company, while not admitting liability, agreed to an adjustment under which the 16-inch pipe line in the Potrero district is being replaced at its expense.

Complaints on Quality of Water:

From time to time, particularly at certain seasons of the year, complaints are had as to the quality of the water. These complaints may be grouped into two general classes—those due to dirty water and those due to taste or odor.

With reference to the first of these—the water supplied to San Francisco is not filtered. It is taken primarily from large catchment reservoirs which impound the runoff from the rainfall on the protected watersheds. During periods of heavy rainfall, the storm waters running into these reservoirs carry a large amount of soil in suspension, most of which settles out in the reservoirs.

The clarity of the water entering the transmission mains from the storage reservoirs will be affected, among other conditions, by the amount of silt carried into the reservoirs during the floods and the amount of clear water in storage at the time. The amount of water in storage is a very important factor, as this serves to dilute the turbid flood waters, and the larger the amount in storage, the greater the opportunity for the suspended matter to settle out.

Under the best conditions there will always be a certain amount of sediment carried into the system, a portion of this is dropped in the distributing reservoirs, a portion is deposited in the distributing mains and some passes on through the faucets in the water as drawn. During the rainy season when the water in the main reservoirs has the greatest turbidity the consumption is the least, due to the lower velocities, a greater amount is deposited in the pipe and distributing reservoirs, in the hot weather the consumption is the greatest and the heavy draft at this time of the year increases the velocity in the mains stirring up the fine sediment which is carried on by the flow causing much complaint from consumers.

With the delivery of Hetch Hetchy water in the Spring of 1934, the volume of water in the reservoir will be greatly enhanced providing a better opportunity for the water to clarify through the process of sedimentation.

At that time, when the water in the main reservoirs is cleared up, it is planned to systematically and thoroughly flush out all of the mains throughout the city. This will be an extended operation involving an expenditure estimated at $15,000 and taking the greater part of the year.

With reference to the taste and odor complaints, for the most part these are due either to algae or to weed growths. Examinations of the water in the main reservoirs are made regularly several times a week and with an indication of development of algae growths copper sulphate treatment is applied. These treatments while effective in suppressing or controlling the algae have no effect on the water weeds, which flourish in the shallow stretches at certain seasons of the year and which impart a musty moldy taste to the water. The only remedy so far developed for the weedy pest is pulling and burning.

Silt deposited in the distributing reservoir is apparently quite a factor in fostering weed growths in these basins, this vegetable matter becoming detached is carried into the pipes and some deposited in the pipes with the silt decays and imparts an unpleasant taste or odor to the water noticeable under certain conditions. Covering of the distributing reservoirs will prevent growths and permit the water being kept clean and sweet. All distributing reservoirs planned for the future are being designed with roofs, existing reservoirs cannot be roofed until the new basins are provided permitting the present ones to be temporarily taken out of service.

PIPE RECORD FOR FISCAL YEAR JULY 1, 1932-JUNE 30, 1933

	Size	Total Pipe in Ground July 1, 1933	Pipe Laid July 1, 1932 June 30, 1933	Total	Taken Out or Abandoned in 1932-1933	Total Pipe in Ground June 30, 1933
Wrought Iron and Steel—						
	½″	1,644	0	1,644	0	1,644
	¾″	10,348	0	10,348	120	10,228
	1″	51,039	0	51,039	3,923	47,116
	1¼″	4,894	0	4,894	0	4,894
	1½″	378,775	348	379,123	33,130	345,993
	2″	910,789	3,109	913,898	41,443 342,000*	530,455
Galv.	3″	31,897	12	31,909	1,063	30,846
Dip.	3″	1,419	0	1,419	0	1,419
G. & D.	4″	8,852	0	8,852	43	8,809
Galv.	5″	804	0	804	0	804
Dip.	6″	3,832	0	3,832	0	3,832
Galv.	6″	154	0	154	37	117
Galv.	8″	17	0	17	0	17
Galv.	12″	6,555	0	6,555	0	6,555
	13″	456	0	456	0	456
	16″	20,066	0	20,066	0	20,066
	20″	40,940	0	40,940	0	40,940
	22″	25,017	0	25,017	0	25,017
	23½″	9,087	0	9,087	0	9,087
	24″	12,632	5	12,637	0	12,637
	30″	19,993	0	19,993	0	19,993
	33″	2,409	0	2,409	0	2,409
	36″	9,223	0	9,223	0	9,223
	37½″	8,896	0	8,896	0	8,896
	44″	6,999	0	6,999	0	6,999
	48″	11,504	0	11,504	0	11,504
Total		1,578,241	3,474	1,581,715	421,759	1,159,956
C. I. Pipe—						
	2″	0	2,384	2,384	0	2,384
	3″	62,733	379	63,112	0	63,112
	4″	470,273	2,128	472,401	1,492	470,909
	6″	916,220	85,730	1,001,950	0	1,001,950
	8″	1,119,219	39,285	1,158,504	0	1,158,504
	10″	6,873	0	6,873	0	6,873
	12″	300,886	0	300,886	0	300,886
	16″	161,159	0	161,159	0	161,159
	20″	22,642	0	22,642	0	22,642
	22″	19,058	0	19,058	0	19,058
	24″	52,171	0	52,171	0	52,171
	30″	4,376	0	4,376	0	4,376
TOTAL		3,135,610	129,906	3,265,516	1,492	3,264,024
GRAND TOTAL		4,713,851	133,380	4,847,231	423,251	4,423,980
Total Miles		892.77	25.26	918.03	80.16	837.87

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* 342,000 ft.-2″ overestimated pipe taken over from the Municipal system in McLaren Park area.

INVENTORY OF GATES AND COCKS IN THE CITY DISTRIBUTION SYSTEM, JULY 1, 1933

Gates		Service Gates		Stop Cocks		Blow Offs		Air Valves		Check Valves	
Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.
2″	6	3″	285	½″	1	¾″	11	¾″	27	1½″	11
3″	233	4″	255	⅝″	18	1″	48	1″	7	2″	10
4″	912	6″	119	¾″	142	1½″	335	1½″	158	3″	1
6″	1865	8″	49	1″	202	2″	905	2″	58	4″	8
8″	2198			1¼″	3	3″	111	3″	5	6″	17
10″	6			1½″	1424	4″	87	4″	1	8″	17
12″	627			2″	3863	6″	64	6″	12	12″	3
16″	239			2½″	3	8″	55	8″	73	16″	3
20″	21					12″	8				
22″	22					16″	2				
24″	44										
30″	7										
36″	11										
37½″	2										

PUMPING STATION ACCOUNTS 1932-1933

STEAM PUMPS

	Labor	Autos	Material	Fuel or Power	Machine Shop	Journal Entries & Misc.	Total
Central	$ 25,686.73	$ 21.84	$ 476.12	$12,901.99	$ 402.49	$ 13.36	$39,502.53
City	28,419.28	30.66	1,313.14	11,516.32	539.71	910.13	42,729.24
Black Point	* 735.27	2.81	39.34	....	1.40	578.50	1,357.32
Clarendon Heights	* 310.08	.36	8.48	....	9.67	360.11	688.70
Ocean View	* 89.56	1.25	2.17	....	....	.20	93.18
	$ 55,240.92	$ 56.92	$ 1,839.25	$24,418.31	$ 953.27	$1,862.30	$84,370.97

ELECTRIC PUMPS

	Labor	Autos	Material	Fuel or Power	Machine Shop	Journal Entries & Misc.	Total
Crocker Amazon	$ 142.96	$ 37.38	$ 4.59	$ 87.76	....	....	$ 272.69
Daly Hill	135.50	28.18	9.03	601.76	$ 11.25	....	785.72
Fairview	163.53	33.64	9.85	29.96	7.02	....	244.00
Forest Hill	443.62	171.89	632.59	2,619.09	820.05	$ 37.71	4,724.95
Hillside	147.22	44.65	.31	248.56	....	....	440.74
Leland Avenue	90.07	5.46	34.74†	34.73	....	....	95.52
Lincoln Park	216.86	61.88	16.67	15.56	32.47	....	343.44
Lake Honda	44.81	5.12	10.28	1,994.12	....	.10	2,054.43
Newcomb Avenue	158.04	47.44	18.70	394.84	1.40	....	620.42
Potrero Heights	121.65	41.68	.51	54.12	....	....	217.96
Precita Valley	80.72	.84	5.24	....	....	363.43	450.23
Twin Peaks	170.35	43.77	11.49	33.20	13.71	....	272.52
Sunset Booster	6,481.08	4.31	314.61	29,007.39	34.94	15.16	35,857.49
Sunset Source	3,716.61	3.69	186.13	14,503.73	117.00	1.86	18,529.02
University	144.41	51.94	19.85	70.80	4.90	....	291.90
TOTALS	$ 12,257.43	$581.87	$ 1,205.11	$49,695.62	$ 1,042.74	$ 418.26	$65,201.03
All Stations TOTALS	$ 67,498.35	$638.79	$ 3,044.36	$74,113.93	$ 1,996.01	$ 2,280.56	$149,572.00

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* Gardening and Maintenance.
†Credit.

CITY DISTRIBUTION DIVISION OPERATING EXPENSES, 1932-1933

	Labor	Autos	Compressor	Materials	Paving	Machine Shop	Misc.	Total
SOURCE:								
City Pump Supply Line	$ 63.00							$ 63.00
Daly Hill Pump S. Line	4.79	$ .92						5.71
Lake Merced	6,705.89	332.08		$ 268.51		$ 8.42	$ 130.98	7,445.88
Sunset Wells	599.19	113.34		85.18	$ 10.77	15.97	123.00	947.45
Sunset P. S. Line	33.55	5.90	6.72				*17.30*	28.87
PURIFICATION:								
College Hill Screen System	82.84	4.56		120.93		1.62	97.05	307.00
Lake Honda Purification Sys.	6,744.35	1.28		136.29		7.72	379.61	7,269.25
Lake Merced Purific't'n Sys.	1.69	1.23		204.35			108.26	315.53
Sunset Purification System	17.75	7.21		431.46		.31	41.64	498.37
Univ. Md. Res. Purification	35.44			68.14			20.77	124.35
C.D.D. Purification Gen.	14.23	5.02					54.37	73.62
TRANSMISSION & DIST.:								
Superintendence	30,003.98	1,718.79		145.05			393.88	32,261.70
City Reservoirs	10,941.03	109.74	5.00	684.48	123.84	193.87	1,521.07	13,579.03
Meter Expense	25,177.85	3,005.44	5.96	13,922.18	1,519.81	176.43	293.90	44,101.57
Street Dept. Expense	12,380.58	603.07		44.62		14.06	2.60	13,044.93
Reprs. Trans. Mains & Canals	2,606.76	117.71	68.75	514.13	14.19	300.43	83.36	3,705.33
Repairs to Distrib. Mains	19,485.03	1,554.54	828.23	1,516.61	2,162.55	757.49	798.78	27,103.23
Service Connection Repairs	39,615.79	5,871.54	3,074.63	13,946.64	10,386.96	83.19		72,978.75
C. D. D. General	9,316.78	146.96	1.66	1,248.19	8.67	1,558.38	1,794.35	14,074.99
	$163,830.52	$13,599.33	$3,990.95	$33,336.76	$14,226.79	$ 3,117.89	$5,826.32	$237,928.56

CITY DISTRIBUTION DIVISION CONSTRUCTION, 1932-1933

	Labor	Autos	Compressor	Materials	Paving	Misc.	Trencher	Total
Service Connections	$ 6,532.26	$ 943.79	$ 672.90	$ 2,418.18	$ 1,262.87	$ 1,263.65		$ 13,093.65
Meter Account	2,537.24	511.57	11.39	4,586.64	406.47	205.74		8,259.05
City District Mains	62,795.49	2,974.05	5,372.95	87,947.80	38,208.61	9,056.58	$2,545.00	208,900.48
Francisco St. Reservoir						7,749.23		7,749.23
Lombard St. Reservoir				4.30		76.17		80.47
Potrero Hts. Reservoir				8.28				8.28
	$71,864.99	$4,429.41	$6,057.24	$94,965.20	$39,877.95	$18,476.37	$2,545.00	$238,091.16

ENGINEERING DIVISION

Following is a brief description of the various projects, the plans and specifications for which were prepared in the office of the Engineering Division during the fiscal years 1931-32 and 1932-33, and a statement of the progress of the work at the end of the 1932-33 fiscal year.

Pleasanton Wells—Contracts Nos. 10 and 11:

The lowering of the water table in the Pleasanton Valley during the long period of drought necessitated sinking some additional wells and deepening some of the existing ones. This work was done under two contracts.

Under Contract No. 10, two new wells of the gravel envelope type, with 14-inch, 10-gauge outside course and 12-gauge inside course, double stove pipe casings in a 26-inch bore, were sunk to depths of 368 feet, and protected with 30-inch conductor pipes to depths of 80 feet and 87 feet respectively. The contract was let to L. A. Anderson, July 8, 1931; work was begun July 28, 1931 and the wells completed September 25, 1931, and November 25, 1931, respectively.

Contract No. 11 covered the work of deepening ten of the existing 14-inch gravel envelope wells by amounts varying from 138 to 210 feet, and installing 12-inch diameter, 14-gauge, double stove pipe casings, perforated at water bearing strata. The contract was let July 8, 1931, and work completed November 14, 1931, by the contractor, J. S. Roberson and Son.

UPPER ALAMEDA CREEK DIVERSION DAM
View looking upstream during construction.

Upper Alameda Tunnel:

This tunnel of horse-shoe section 5½ feet wide and 6½ feet high is 9709 feet in length from the east portal in Upper Alameda Creek to its west portal or outfall into Calaveras reservoir. The tunnel is concrete lined throughout; constructed on a grade of 1 foot in 100, and has a capacity of 650 cubic feet per second. Construction was started under the Spring Valley Company in 1925, but was prosecuted with only one shift on one heading until the City took over the properties in March 1930, when three shifts were installed working from both portals and the work vigorously prosecuted by the department forces under day labor. On June 30, 1931 there were 3400 feet of concrete lining to be placed. The tunnel was holed through on May 7, 1931. Concrete lining completed on November 19, 1931. In driving the tunnel, much of it was in extremely heavy swelling ground, and at times much methane gas was encountered adding materially to the hazard and expense in driving. The total cost of the tunnel work was $855,452 of which $307,381 was expended by the Spring Valley Company and $538,071 expended under the department.

The first flood waters were diverted through the tunnel on December 23, 1931.

Upper Alameda Diversion Dam—Contract No. 12:

This is a reinforced concrete structure of the "slab and buttress" type with overfall section. As constructed the dam has a maximum height of 30 feet and a crest length of approximately 130 feet, of which 90 feet is constructed as an overfall section designed to pass floods of 7500 second feet with 7½ feet depth over the crest. The trash racks, a sand trap and sluice way, and the control gates leading to the tunnel, are on the left bank of the creek and are accessible by a gallery through the dam.

Various types of dam were considered in the preliminary studies, gravity and arch types being eliminated immediately because of foundation conditions. Studies were made for rock fill and earth fill but were likewise eliminated on account of scarcity of suitable material at the site and the difficulty of providing adequate spillway capacity. The design chosen was best suited to the site and was the most economical of all these studies. The plans were completed and approved by the State Engineer, as required by law and bids were advertised and the contract was awarded to Barrett & Hilp on July 17, 1931.

The contractor started work on August 1, 1931 and completed the structure on December 19, 1931—in time to divert the first flood of the season on December 23.

The work involved, among other items, included approximately 4800 cubic yards of excavation, 4500 cubic yards of concrete and 288,000 pounds of reinforcing steel. The total cost was $73,843.31.

New Crystal Springs Outlet:

Plans were prepared and the construction of this new outlet was undertaken by the Department forces under day labor during the fall of 1931, taking advantage of the extremely low level of the water in Crystal Springs reservoir to complete the intake structures and the gate shaft.

The work performed consisted of constructing a concrete lined shaft 16 feet in diameter and 80 feet in depth surmounted by a tower 30 feet in height, three short adits, concrete lined, were driven from the reservoir side connecting into this shaft at depths of 34, 63 and 105 feet below the maximum high water elevation. Control gates for each of these adits were installed in the shaft and horizontal screens were placed at the inlet.

The remaining work of installing the standpipe in the shaft and driving the outlet tunnel from the shaft can all be performed at any time when needed, without consideration to the height of water in the reservoir. The cost of the work to June 30th amounted to $109,380.10.

Improvement of Westerly Half of Hamilton Street, Between Bacon and Burrows—Contract No. 13:

This contract covers the work of improving the westerly half of Hamilton Street between Bacon and Burrows Streets, which bounds the University Mound Reservoir tract on the east.

The street was brought to the official grade by excavating approximately 2,000 cubic yards, paved with a 2-inch asphaltic concrete wearing surface on a 6-inch concrete base and an armored concrete curb and side sewers constructed.

The contract was awarded to the Municipal Construction Company July 17, 1931 and the work completed November 13, 1931.

Crystal Springs Aqueduct—Contract No. 14:

This aqueduct replaces the old wooden flume through which water was pumped from Crystal Springs reservoir to San Andres reservoir.

The capacity of the new aqueduct is 60 million gallons per day for 3.98 miles of its length, as compared with 20 million gallons for the old flume, and 80 million gallons per day for the remaining 1.78 miles. The last two miles are constructed of larger sections in order to handle the additional water entering the aqueduct at its junction with the Stone Dam Aqueduct.

Plans and specifications were prepared on the basis of several types of construction, and bids asked upon four propositions as follows:

1. A redwood flume replacing the old flume as far as the junction with the Stone Dam Aqueduct (3.98 miles).

2. A Lennon type semi-circular metal flume replacing the old flume only as far as the junction with the Stone Dam Aqueduct.

3. A concrete lined canal with redwood flumes on timber trestles across depressions, replacing the entire old flume.

4. A concrete lined canal with Lennon type semi-circular metal flume on timber trestle across depressions, replacing the entire old flume.

Alternate bids were asked, also, upon two types of lining for the canal of Propositions 3 and 4, namely, 3-inch poured concrete and 2-inch gunite.

Proposition 4 was adopted, and the aqueduct, as constructed, consists of 20,157 feet of canal having a bottom width of 3 feet and a depth of 3 feet 9 inches, 5122 feet of canal having a bottom width of 4 feet and depth of 4 feet, and 4203 feet of canal having a bottom width of 4 feet and a depth varying from 4 feet to 5 feet 2 inches, all lined with 2 inches of gunite, and with side slopes 1:1; 456.4 feet of 7-foot diameter No. 16 gauge Lennon type semi-circular metal flume supported on timber trestle; 118.4 feet of 5 feet 8 inches depth by 5 feet 9 inches width redwood flume on timber trestle; 238 feet of 66-inch diameter by ⅜-inch plate welded steel siphon, where the aqueduct crosses the Skyline Boulevard; and 157.7 feet of transitions and other concrete structures.

The average grade of the aqueduct for the first 3.98 miles (3-foot bottom by 3-foot 9-inch depth) is 6.7 per mile; for the next 0.96 miles (4-foot bottom by 4-foot depth) 6.2 feet per mile; and for the remaining 0.82 miles (variable section) 2.6 feet per mile.

The total excavation involved in the contract was 55,517 cubic yards, with 438,106 square feet of gunite lining.

UPPER ALAMEDA CREEK DIVERSION DAM

Ten days after completion 600 cubic feet per second passing over the spillway with 430 million gallons daily being diverted into Calaveras Reservoir through the screen rack and tunnel to the right.

The quantity of water pumped into the aqueduct is measured by a weir and automatic recorder located in the head-box.

The contract was let to MacDonald and Kahn on September 3, 1931 and work under it began September 4, 1931. Water from the Stone Dam Aqueduct was turned into the last 1.78 miles November 19, 1931 and pumping through the entire aqueduct began April 5, 1932.

Crystal Springs Aqueduct Supply Pipe Line—Contract No. 15:

This pipe line, 1408 feet in length, extends from the San Andres pumps to the head of the New Crystal Springs Aqueduct. Its purpose is to provide increased capacity for delivering water from the Crystal Springs reservoir into the San Andres reservoir, and will serve in addition to the existing smaller lines. The line will be connected to the two new pump units which are being installed in the Crystal Springs Pump Station, the present unit continuing to discharge through the existing lines.

The first 936 feet from the pump station, or from elevation 151 to elevation 387, consists of new 48-inch diameter by ⅜-inch plate, electrically welded steel pipe with electrically welded field joints. Between elevation 387 and elevation 482 at the headbox of the aqueduct, pipe on hand left over from other lines was installed. This consists of 184 feet of 54-inch diameter by 5/16-inch plate, Lockbar steel pipe, and 304 feet of 54-inch diameter by 9/32-inch plate, riveted wrought iron pipe, both with riveted field joints. The pipe is buried with an average cover of approximately 30 inches and, excepting the 304 feet of riveted pipe, is coated with an asphaltic dip and wrapped with a soilproof covering.

Only two bids were received for the construction of this pipe line, one from Western Pipe and Steel Company in the sum of $25,778.85 and one from Montague Pipe and Steel Company in the sum of $27,849.50 and award was temporarily held up while a new set of specifications (Contract No. 22) was prepared, with a view of securing more competition. In the meantime, an advance had taken place in the price of steel and investigation made it appear probable that readvertising would result in a higher bid, so the contract was awarded on the original bid.

Contract for this work was awarded to the Western Pipe and Steel Company on May 9, 1932, and completed November 12, 1932 at a cost of $21,277.13.

Improvement of Felton Street, Between Colby and Dartmouth—Contract No. 16:

This contract covered the improvement of one block of Felton Street which bounds the University Mound reservoir tract on the north.

The street and sidewalk areas were brought to the official grade, the street paved with a 2-inch asphaltic concrete wearing surface on a 6-inch concrete base, and armored concrete curb, a brick catch basin, and a 10-inch vitrified clay pipe culvert constructed.

The Contract was awarded to Eaton & Smith on January 6, 1932 and the work completed May 20, 1932.

Roof for Portrero Heights Reservoir—Contract No. 17:

In order to protect the waters of the Potrero Heights reservoir from pollution and algae growths, a tar and gravel wooden roof, supported on concrete columns, was constructed under this contract.

The roof consists of a tar and gravel surface over 1-inch by 10-inch wooden sheathing. The sheathing is laid on 2-inch by 10-inch wooden rafters, which in turn rest upon 8-inch by 12-inch wooden beams supported by 8-inch by 8-inch reinforced concrete columns extending to the reservoir floor.

The total area of the roof is approximately 11,950 square feet.

The contract was awarded to W. V. Bernard on April 11, 1932 and work completed on June 3, 1932.

Street Paving—Contract No. 18:

Specifications were prepared and bids received for paving over all street openings made for the purpose of the Water Department. The work under this contract is, primarily, the repaving over pipe trenches for main extensions and service connections. The work was performed by J. O'Shea, Inc., from January to the end of the fiscal year.

Paving at Millbrae Station—Contract No. 19:

Under this contract certain pavement consisting of approximately 18,000 square feet of emulsified asphalt wearing surface on a 1½-inch thick crushed rock base, and approximately 18,000 square feet of emulsified asphalt wearing surface only was installed on certain roadway and yard areas at Millbrae Station as a protection against dirt and mud.

The contract was awarded to A. G. Raisch on April 11, 1932, and completed on April 29, 1932, but final acceptance was not made until March 1, 1933.

Retaining Wall and Sidewalk on the West Side of Hyde Street, Between Greenwich and Lombard Streets—Contract No. 20:

In order to provide a sidewalk in front of the Water Department's Lombard Street reservoir, it was necessary to excavate the toe of the reservoir embankment and construct a reinforced concrete retaining wall 6 feet high by 275 feet long.

This work was done under Contract No. 20 and involved approximately 250 cubic yards of excavation, 1120 square feet of concrete sidewalk, 75 cubic yards of concrete for the retaining wall, and a 6-inch tile drain on a crushed rock bed.

The contract was awarded to A. B. Gerding on April 11, 1932, and the work completed June 7, 1932.

Sawyer Camp Cottage, Garage, Barn, and Cesspool—Contract No. 21:

This contract covered the construction of a five-room, wood frame and stucco cottage for the caretaker, together with a wood frame and stucco one-car garage, a wood frame and corrugated iron barn, and a concrete cesspool, near Sawyer Camp at the north end of Crystal Springs reservoir.

This cottage replaces an old one which had fallen into a bad state of repair, and, besides, was in a location poorly suited to present and future operating conditions.

The contract was let to Einar C. Petersen, May 9, 1932, and the work completed August 16, 1932.

Contract No. 22:

Alternate to Contract No. 15. Specifications prepared and cancelled.

Street Repaving for Fiscal Years 1932-33—Contract No. 23:

Under Contract No. 23, all street and sidewalk openings excavated by the Water Department during the fiscal year 1932-33, in making extensions and repairs, were repaved.

Bids were received for this work on June 30, 1932, and awarded to the Pacific Pavements Company. The work done under the contract amounted to $48,824.19.

8-Inch C. I. Pipe in Jefferson Street—Contract No. 24:

Under this contract J. O'Shea, Inc., laid 1970 feet of cast iron pipe in Jefferson Street from Powell to Leavenworth Streets. This line is a part of the general program of the City to improve and develop the land lying along the waterfront from Powell Street westerly to Jones Street. The contract was awarded on August 8, 1932 and completed September 15, 1932.

8-Inch C. I. Pipe in Army and Kansas Streets—Contract No. 25:

Under this contract 2000 feet of 8-inch cast iron pipe line was laid in Army and Kansas Streets from Hampshire Street to a point south of 25th Street, in order to relieve the low pressure conditions in the area east of Potrero Avenue including the San Francisco Hospital and adjacent residences. The contract was awarded to the Water Department as low bidders on September 9, 1932, and the work completed on October 7, 1932.

Gathering and Delivering Walnut Crop—Contract No. 26:

C. H. Schween & Son were successful bidders for the harvesting of the walnut crop produced at the Water Department's Sunol orchard. This contract involved the gathering of the walnut crop approximately 104 tons, delivery to the dehydrator at Sunol, and then to the packing house at Walnut Creek. The contract was awarded on September 12, 1932 and completed on October 29, 1932.

Painting of Buildings, Tanks and Structures—Contract No. 27:

Under this contract, certain pump station buildings, reservoir keepers' houses, tanks and other structures in the City Division were to be painted. All bids were rejected and the work was performed by the Department of Public Works at a cost of $4,827.17.

Protection Work for Upper Alameda Creek Dam and Tunnel—Contract No. 28:

This contract covers the construction of an outlet structure at the west end of the Upper Alameda Creek tunnel, an extension to the downstream apron of the Upper Alameda Creek dam and the construction of gutters, stairways and other improvements at this dam.

The construction of the outlet structure, which consists of a concrete stilling basin and flume discharging the water into Calaveras reservoir at a point 100 feet from the tunnel portal, was deferred following the completion of the diversion dam and tunnel, in order to allow the first season's flood to remove the overburden in the gulch at the tunnel outfall and exposed bed rock.

Considerable erosion of the stream bed immediately below the downstream apron of the Upper Alameda Creek dam, was caused by the first season's floods. In order to prevent further erosion, a 70-foot extension to this apron was constructed; rip-rapped gutters and certain fills were constructed at the east abutment of the dam in order to prevent erosion from local runoff.

The contract for this work was awarded to C. A. Bruce & Sons on October 24, 1932. Work was immediately started and completed on February 9, 1933. The work involved among other things 1290 cubic yards of excavation, 592 cubic yards of concrete and 44,500 pounds of reinforcing steel. The total cost was $15,085.80.

6-Inch and 8-Inch Cast Iron Mains—Contract No. 29:

Plans and specifications were prepared and bids called for, but not opened on account of some question as to the wage schedule. No contract was awarded. Under these specifications were contemplated about 3,600 feet of 6-inch and 8-inch cast iron mains in various locations throughout the City.

Drilling Test Wells at Calaveras Dam—Contract No. 30:

This contract provides for the drilling of 2 or more inspection wells on the Calaveras dam. The purpose of these wells is to obtain additional information regarding the extent of saturation of the downstream embankment. The contract was awarded June 26, 1933 to Robert Garcia.

Changing Heating System in Water Department Building—Contract No. 31:

The heating system in the San Francisco Water Department Building was changed from the existing district steam supply to a steam generating plant using gas as fuel. A savings of about 50 per cent in the annual heating bill is anticipated by virtue of the new plant. The contract was awarded to J. H. Pinkerton on March 27, 1933, and completed on June 16, 1933.

Crystal Springs Pump Station Extension—Contract No. 32:

With the completion of the Hetch Hetchy aqueduct scheduled for the early part of 1934; the delivery of water into Crystal Springs Reservoir will be greatly increased. The installation of additional pumps at Crystal Springs dam, together with the completion of the Crystal Springs aqueduct and supply line (under Contracts 14 and 15) and the concrete siphon now under construction, will make it possible to pump about 60 m.g.d. from Crystal Springs to San Andres reservoir, thereby increasing the water available for the pipe lines having their source at San Andres reservoir.

The work under this contract includes the installation of one 1000-hp. unit and one 700-hp. unit together with all necessary outside and inside piping, gate valves, electrical conduits and switchboard and a 24-foot extension to the north end of the pump station building.

Eight bids were received for this work ranging from $22,590.50 to $30,885.00. On May 11, 1933 the contract was awarded to G. W. Williams Company, the low bidder. On June 30, 1933, the work was about 7 per cent complete.

16-Inch Cast Iron Pipe in Forest Hill Subdivision—Contract No. 33:

To serve as a main feeder line to Miraloma Park and the adjacent area on the slopes of Mt. Davidson, about 5500 feet of 16-inch line is to be installed under this contract. The contract was awarded to Eaton & Smith on June 12, 1933 for $5,898.25 and on June 30, 1933 was about 1.5 per cent complete.

Millbrae-Crystal Springs Transmission Line—Contract No. 34:

Under this contract the existing No. 6 copper wire on this line, which serves the Crystal Springs pump station and which had become badly crystallized, was replaced with No. 4 stranded wire, the pole structures were repaired and the insulators replaced or cleaned. The contract was awarded to the West Coast Electric Works on May 8, 1933 and completed June 16, 1933 at a cost of $2256.96.

16-Inch Cast Iron Pipe in 19th Avenue and Ulloa Street—Contract No. 35:

Under this contract about 5700 feet of 16-inch cast iron pipe is being laid on 19th Avenue from Sloat Boulevard to Ulloa Street and thence along Ulloa Street to 29th Avenue. This line being a secondary feeder main into the Parkside area. The contract was awarded on May 8, 1933 to E. J. Treacy for $5,258.15 and on June 30, 1933 was about 96 per cent complete.

16-Inch Cast Iron Pipe on San Pablo, Yerba Buena and Plymouth—Contract No. 36:

About 5500 feet of 16-inch cast iron pipe is being laid along San Pablo, Yerba Buena and Plymouth, from Portola Drive to Wildwood Avenue. This line will be a secondary feeder main in the Stanford Heights area lying on the westerly and southerly slopes of Mt. Davidson and including portions of St. Francis Wood, Westwood Park and Westwood Highlands; and is also a part of the development to bring Stanford Heights water towards Daly City and the Amazon Tract. The contract was awarded on June 12, 1933 to E. J. Treacy for $7,392.25.

16-Inch and 12-Inch Cast Iron Pipe on Judah Street and Ocean Avenue—Contract No. 37:

The 16-inch cast iron pipe line to be laid on Judah Street from 19th to 29th Avenues is a much needed secondary feeder line westerly through the Sunset District. This line will be about 3150 feet long. The 12-inch cast iron pipe to be laid on Ocean Avenue from Faxon to Phelan Avenue, about 2500 feet, is needed to give additional service to the adjacent growing district. On June 12, 1933, the contract was awarded to J. O'Shea, Inc., for $6,808.60.

Contract No. 38:

Superseded by Contract No. 38-A.

Contracts 38-A, 39 and 41:

These three contracts were let as part of the general scheme to enable the shut down of the Lake Merced pumping station with a resulting saving in operating costs of approximately $40,000 a year.

16-Inch and 12-Inch Cast Iron Feeder Mains for the Lakeview Hill, Daly Hill and Crocker Amazon Districts—Contract No. 38-A:

Under this contract about 3900 feet of 16-inch and 7800 feet of 12-inch cast iron pipe will be laid in order to bring Stanford Heights water over for the higher portions of the Daly Hill district lying adjacent to Daly City and extending around through the Amazon tract. These areas will be supplied with Stanford Heights water when the Lake Merced pumps are shut down. The contract was awarded to the Lowrie Paving Company, for $13,716.95 on June 26, 1933.

Contracts Nos. 39 and 41:

Under Contract No. 39 about 3100 feet of 30-inch diameter steel pipe line of 3/16-inch plate will be laid in order to relocate sections of the 30-inch Lake Honda transmission line and to replace a portion of that line over the Lakeview Hill by a tunnel. This is necessary in order to supply the Daly Hill District directly from the 54-inch San Andres transmission line, the several portions of line to be replaced being above the hydraulic gradient under the proposed new operating conditions. Theodore Cohn was awarded this contract on June 26, 1933 for $18,211.00.

Contract No. 41 provides for the construction of a 3-foot diameter concrete or steel lined tunnel, about 870 feet long, through the Lakeview hill. The contract was awarded to the Youdall Construction Company on June 26, 1933 for $22,990.00.

Concrete Siphon on Crystal Springs Aqueduct—Contract No. 40:

This siphon will replace that portion of the old wooden flume and chute at the San Andres Dam which is in poor condition and limits the flow through the Crystal Springs Aqueduct.

The total length of the 72-inch reinforced concrete siphon to be installed is 600 feet. In addition to this, there will be 150 feet of concrete inlet flume with headbox, 160 feet of concrete outlet box and chute, 30 feet of steel pipe and 100 feet of 36-inch reinforced concrete pipe spillway.

Thirteen bids were received for this work ranging from $17,250 to $27,531. On June 26, 1933 the contract was awarded to Charles L. Harney, the low bidder.

Repaving Street sand Sidewalk Openings—Contract No. 42:

Under Contract No. 42, all street and sidewalk openings excavated by the Water Department during the fiscal year 1932-33, in making extensions and repairs, will be repaved.

Bids were received for this work on June 26, 1933 and awarded to the Pacific Pavements Company.

In addition to the foregoing work having to do with contract and construction work, other work engaged the attention of the office, as follows:

For the Fiscal Year 1931-32:

Upon the completion of the Upper Alameda dam, final plans showing the structure as actually completed were prepared for filing with the State Engineering Department as required by law.

Record maps and profiles were prepared of the Newark-San Lorenzo pipe line as installed. In addition, numerous detail maps of various parcels of land and improvements were prepared for use as Court exhibits in several condemnation suits in connection with securing rights of way for this pipe line.

Preliminary studies were made of several projects necessary in connection with preparation of budget estimates including—the Upper Alameda tunnel outfall structure and apron for the diversion dam; new pump units and extension of the Crystal Springs-San Andres pump station; University Mound reservoir extension, a project for providing additional storage within the City limits for serving the industrial and commercial districts; and various other minor improvements.

For the Fiscal Year 1932-33:

Preliminary studies were made of the following projects: Calaveras pipe line, University Mound reservoir extension, Sunset reservoir, the new Crystal Springs pipe line and the Bay Crossing pipe line No. 2. All of these projects, excepting the Calaveras pipe line are under consideration as a part of the Water Department's program for construction under the National Industrial Recovery Act.

Considerable time was spent in making a valuation of physical properties for the purpose of determining depreciation and studying future water rates.

Certain work was also done for other City departments, viz.: the plans for the County jail water supply were reviewed, and several small jobs done for the Municipal airport.

In addition to the work related to improvements, the usual routine work was carried on necessary to maintain our record maps of all pipe installations which are brought up to date each week, the hydrographic and water records, making routine reports and studies of operating conditions as to possible economies, estimates for preparing the annual budget, etc.

CONTRACT DATA—SAN FRANCISCO WATER DEPARTMENT
July 1, 1931-June 30, 1933

Contract No.	Title of Contract	Division	Contractor	Awarded	Completed Date	% Fin.	Contract Amount*	Payments to 6/30/33	Date Final Payment
10	Drilling 2 to 6 wells near Pleasanton....	Alameda	L. A. Anderson	7/ 8/31	1/19/32	100%	$ 20,532.00	$ 8,030.25	12/31/31
11	Deepening 2 to 12 wells nr. Pleasanton	Alameda	J. S. Roberson	7/ 8/31	11/14/31	100%	4,200.00	7,126.28	11/30/31
12	Upper Alameda Creek Diversion Dam..	Alameda	Barrett & Hilp	7/17/31	12/19/31	100%	54,596.00	73,843.31	3/ 2/32
13	Improvement of the westerly ½ of Hamilton St. bet. Bacon & Burrows Sts.	City Dist.	Mun. Const. Co.	7/17/31	11/13/31	100%	3,574.00	4,740.59	11/30/31
14	Crystal Springs Aqueduct....................	Peninsula	M'Donald & Kahn	9/ 3/31	3/25/32	100%	125,485.70	143,246.06	8/26/32
15	Crystal Springs Aque. Sup. Pipe Line	Peninsula	West. Pipe & Stl.	5/ 9/32	11/12/32	100%	25,778.85	21,277.33	12/ 3/32
16	Improvement of Felton St. bet. Colby & Dartmouth..	City Dist.	Eaton & Smith	1/ 6/32	5/20/32	100%	1,967.50	2,067.49	5/16/32
17	Roof for Potrero Heights Reservoir......	City Dist.	W. V. Bernard	4/11/32	6/ 3/32	100%	1,888.00	1,888.00	5/31/32
18	Street Paving..	City Dist.	J. O'Shea, Inc.	2/24/32	6/30/32	100%	....	5,847.42	7/29/32
19	Paving at Millbrae Pumping Station....	Peninsula	A. G. Raisch	4/11/32	4/29/32	100%	1,080.00	1,080.00	3/ 1/33
20	Retaining wall and sidewalk W. side Hyde St. bet. Greenwich and Lombard	City Dist.	A. B. Gerding	4/11/32	6/ 7/32	100%	1,612.40	1,668.40	6/28/32
21	Cottage, Garage, Barn and Cesspool at Sawyer Camp..	Peninsula	Einar C. Petersen	5/ 9/32	8/16/32	100%	4,259.00	4,259.00	8/31/32
22	Alternate for No. 15 (Cancelled)..........	....	....	....	....	....	....	....	....
23	Street Paving for Fiscal Year 1932-33	City Dist.	Pac. Pave. Co.	7/25/32	6/30/33	100%	51,811.00	48,824.19	6/30/33
24	Laying 8-in. C. I. Pipe Line in Jeff. St.	City Dist.	J. O'Shea, Inc.	8/ 8/32	9/15/32	100%	895.70	840.26	9/30/32
25	Laying 8-in. C. I. Pipe Line in Army St.	City Dist.	S. F. W. D.	9/12/32	10/ 7/32	100%	1,194.75	860.74	11/30/32

26	Gathering & Delivering Walnut Crop..	Agricultural	Schween & Son	9/12/32	10/29/32	100%	4,590.00	5.273.30	10/31/32
27	For Painting of Bldgs. for S. F. W. D.	City Dist.	(Bids called and rejected. Work performed by D. of P. W. at cost of $4,827.17)						
28	Protection Work for Upper Alameda Creek Dam and Tunnel........	Alameda	C. A. Bruce & Sons	10/24/32	2/ 9/33	100%	$ 13,860.00	$ 15,085.80	3/31/33
29	Laying 6-in & 8-in. Mains (Cancelled)	....	....	....	....	....	....	....	....
30	Drilling Test Wells at Calaveras Dam	Alameda	Robert Garcia	6/26/33	....	0	4,212.60	None	....
31	Changing Heat. Sys. S. F. W. D. Bldg.	....	J. H. Pinkerton	3/27/33	6/16/33	100%	2,240.00	2,240.00	6/30/33
32	Crystal Springs Pump Station Ext.......	Peninsula	G.W.Williams Co.	5/11/33	....	7.4%	22,590.00	1,496.72	....
33	Laying 16-in. C. I. Pipe thru Forest Hill Subdivision........	City Dist.	Eaton & Smith	6/12/33	....	1.4%	5,989.25	None	....
34	Millbrae-Crystal Spgs. Transmsn. Line	Peninsula	W. Cst. Elec. Wks.	5/ 8/33	6/13/33	100%	2,786.87	2,256.96	6/30/33
35	Laying 16-in. C. I. Pipe in 19th Ave. & Ulloa St........	City Dist.	E. J. Treacy	5/ 8/33	....	96%	5,258.15	None	....
36	Laying 16-in. Pipe on San Pablo, Yerba Buena & Plymouth Ave........	City Dist.	E. J. Treacy	6/12/33	....	0	7,392.25	None	....
37	Laying 16-in. and 12-in. C. I. Pipe on Judah St. from 19th to 29th Ave........	City Dist.	J. O'Shea, Inc.	6/12/33	....	23%	6,808.60	None	....
38	Laying 16 & 12-in. Mains (Cancelled)	....	....	....	....	....	....	....	....
38-A	Laying 16 & 12-in. C. I. Feeder Mains —Lakeview Hill, Daly Hill & Crocker-Amazon Dists........	City Dist.	Lowrie Pav. Co.	6/26/33	....	....	13,716.95	None	....
39	Laying 30-in. Steel Plate Pipe Lines....	City Dist.	Theodore Cohn	6/12/33	....	....	18,211.00	None	....
40	Concrete Siphon on Crys. Spgs. Aque.	Peninsula	C. L. Harney	6/26/33	....	....	17,250.00	None	....
41	Lakeview Hill Tunnel........	City Dist.	Youdall Con. Co.	6/26/33	....	....	22,990.00	None	....
42	Repaving Sts. and Sidewalk Openings	City Dist.	Pacific Pave. Co.	6/26/33	....	....	50,214.00	None	....

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* Based on estimated quantities.

NECESSARY EXTENSIONS, IMPROVEMENTS AND REPLACEMENTS

"The City of San Francisco in taking over the ownership and operation of its water supply system, at the same time assumed the responsibility and obligation of providing its people with a supply of pure water, adequate at all times to meet the full needs for domestic, commercial and public purposes."

This introductory statement from the previous annual report bears repetition, for due to the diversion of surplus revenues of the Water Department to the general fund of the City, funds have not been made available in sufficient amount to permit the carrying on of a program of construction and replacement adequate to properly maintain the system and anticipate San Francisco's increasing demands.

Generally speaking, the water requirements of a community will increase at a rate somewhat in excess of its population increase, and the capacity of the water system must be expanded to keep in advance of this demand. Roughly, the capital investment in transmission main, pumping stations, distributing mains, services, etc., must be continually increased proportionately to provide the additional capacity necessary to supply the increasing population.

Looking back over the history of the Water System under the private company, we find the relation of capital invested to population as follows:

Year	Population	Capital Invested	Dollar Per Capita
1870	150,000	$12,200,000	81
1890	300,000	25,100,000	83
1910	417,000	37,000,000	88
1930	634,000	63,078,532*	99

* Includes Bay Crossing Pipe and Pulgas Tunnel.

The reproduction cost of the Water Department System new, as of today (June 30, 1933), is approximately $66,000,000. Eliminating from this amount the cost of developing water sources (and all intangibles), for the reason that we have in the Hetch Hetchy project a developed source of supply capable of meeting our requirements for many years to come, we have a figure of approximately $42,000,000 representing the reproduction cost of the transmission and distribution system. This portion of the system must be expanded proportionately with our demands which over a period of many years have averaged 3 per cent. On this basis new capital should be put into the properties at a rate of $1,260,000 per year. This does not provide for depreciation and replacement of worn out or obsolete structures. The annual depreciation on the system is estimated at $780,000 annually on a straight line basis, which amount can be assumed to be adequately provided for or offset through bond redemption, however, there must be provided cash to make replacements when and as needed. Replacements over the next 20 years will average $381,000 per year.

The Water Department budget allowances for additions and betterments since the City acquired the system have totaled $3,686,510 including provision for the year 1933-34, as follows:

1929-30 (3 months)	$ 444,000
1930-31	1,160,760
1931-32	951,750
1932-33	470,000
1933-34	660,000
	$3,686,510

These appropriations it will be noted are materially less than the theoretical amount required, and it is only due to the period of depression during which our consumption has not increased that we are today able to adequately meet consumption demands.

A charter amendment providing for the issuance of a limited amount of short term revenue bonds under which it was proposed to borrow $5,000,000 to finance a number of urgently needed extensions to the system was submitted to the people on November 8, 1932, but defeated by a small margin. This defeat was due it is felt to the limited time available during the campaign to permit the public to gain a proper understanding of the issues involved.

In the annual report for the year 1930-31, attention was directed to a number of major extensions, improvements and replacements required within the five-year period up to 1936. Certain of these improvements have been made, notably—the new Crystal Spring outlet (in part); Crystal Springs aqueduct, pump station and pipe line; Calaveras pipe line; secondary feeder mains (in part). These are only a small part of the program therein outlined.

A report on the necessary extensions to the Water System which could be advantageously financed with Federal aid under a bond issue as a part of the Federal plan contemplated under the National Industrial Recovery Act listed the following for immediate construction:

1. Additional Bay Crossing Pipe Line	$ 4,640,000
2. Crystal Springs University Mound P. L.	2,519,000
3. University Mound Reservoir Addition	1,000,000
4. Sunset Reservoir and Connecting Pipe Lines	1,460,000
5. Extension to Main Pipe System	2,391,000
	$12,010,000

Following is a brief description of the several projects and a statement as to the purposes and necessity therefor.

Additional Bay Crossing Pipe Line:

This item contemplates the construction of the second unit of the Bay Crossing pipe line, paralleling and supplementing the present so-called "Hetch Hetchy Bay Crossing line" from Irvington portal of the Coast Range tunnel to the Pulgas tunnel discharging into Crystal Springs reservoir, also included as an auxiliary is a pumping plant to be located in the vicinity of Sunol to lift this water from Pleasanton and the Sunol gravel beds to the Hetch Hetchy aqueduct so that it may flow by gravity from the point of delivery to Crystal Springs. With the completion of the Hetch Hetchy aqueduct to Irvington portal early in 1934, there will be available on the Alameda side of the Bay 60 m.g.d. from the Hetch Hetchy in addition to the 40 to 50 m.g.d. now available from our Alameda sources. Under Hetch Hetchy conditions of operations, the present pipe line capacity for transporting this water to the Crystal Springs reservoir and the San Francisco Peninsula is 43 m.g.d. by the Hetch Hetchy Bay pipe, and 16 m.g.d. by the old Spring Valley Alameda pipe line. Long sections of this Alameda pipe line are now in such condition of deterioration that this line is frequently out of service for a week or two at a time and it is a question of but a year or two at the most when much of this line must be either replaced or the line abandoned, reducing the transbay pipe capacity to 43 m.g.d.

The completion of the proposed new transbay pipe line and Sunol pumping plant will permit the abandonment of the old Alameda line, and will increase the new transbay pipe capacity for gravity delivery to Crystal Springs reservoir to 90 m.g.d. The completion of this project will also permit discontinuance of operation of the Belmont pumping station and in conjunction with the construction of the Calaveras pipe line will permit the abandonment of the Bay Pulgas pump station. In addition to the operating economies thus effected the project will add greatly to the dependability of our supply as with its completion there will be two independent transbay pipe lines of approximately equal capacity, each with twin submarine sections and so arranged that in case of trouble either line or sections thereof may be temporarily cut out, without interfering with delivery through the remaining lines or sections thereof.

Operating economies resulting from the discontinuance of the Belmont pumps and the Bay Pulgas pumps will effect an annual net saving of $115,000 after allowing for the pumping charges at Sunol.

Crystal Springs-University Mound Pipe Line:

This item contemplates the completion of the new Crystal Springs outlet structure and the construction of three of the four sections of a new pipe line to connect Crystal Springs reservoir in San Mateo County with the University Mound distributing reservoir in San Francisco. The total length of this new line is approximately 109,000 feet, but at this time it is proposed to build only 92,000 feet, deferring the construction of some 17,000 feet between Burlingame and Millbrae for about ten years by utilizing the existing 54-inch line for that distance. This line will parallel generally the existing 44-inch line. It will have capacity under normal conditions of operation to deliver 56 m.g.d. to University Mound reservoir.

The present Crystal Springs line constructed in 1885, is now 48 years of age; it has a designed capacity of 23 m.g.d. and in 1929 just previous to the depression was at times taxed to capacity to meet the demands of the University Mound district which it supplies through the reservoir of that name. The University Mound district comprises the great down-town, commercial and industrial area including the entire waterfront from Hunters Point to the Marina, and utilizing 40 per cent of the water consumed in San Francisco.

With the limited storage available in the University Mound reservoir for this important district continuity of supply is most essential and with this district dependent upon a single line of 48-year-old pipe, certain sections of which are in more or less continual danger of rupture due to ground movements, the importance of a second independent line can not be too strongly emphasized—this aside from the necessity for additional capacity.

The additional capacity provided by this line is sufficient to take care of the needs of the district for many years.

University Mound Reservoir Addition:

Contemplates the construction of a new reservoir basin adjacent to and supplementing the present University Mound reservoir which, at elevation 172 (flow line) with a capacity of 59.4 million gallons, serves as a terminal reservoir for water delivered by gravity from Crystal Springs reservoir (elevation 280 feet flow line) and for the time being from Alameda sources through the Belmont pumps. The proposed new basin will be located immediately south of the present reservoir between Bacon and Woolsey Streets and the University and Bowdoin Streets, and will provide additional capacity of approximately 90,000,000 gallons. It will be of cut and fill construction, lined and roofed with reinforced concrete. A portion of the land required has already been purchased by the Department.

Sunset Reservoir and Connecting Pipe Lines:

Contemplates the construction of the initial section or basin of a new reservoir in the Sunset Heights district to be located between 22nd and 28th Avenues and Ortega and Rivera Streets, together with the necessary pipe lines to connect the same with the 54-inch San Andres pipe line and with the distributing main from the present Lake Honda reservoir. This proposed reservoir with flow line elevation at 385 feet will serve as a terminal reservoir for the 54-inch pipe line from San Andres reservoir in the San Mateo Peninsula (elevation flow line 446) and as a distributing reservoir will supply the main residential district of San Francisco, supplementing the present Lake Honda reservoir (elevation 373), having a higher elevation it will serve a larger area.

The proposed Sunset reservoir will have an initial capacity of approximately 100 million gallons. It will be similar to the University Mound reservoir addition in type of construction, cut and fill, with reinforced concrete lining and roof. The supply line will be approximately 54-inch diameter steel pipe or equivalent, connecting with the present 54-inch San Andres line in the vicinity of Sloat and Junipero Serra Boulevards and extending by connecting streets approximately 9,000 feet to the reservoir. The discharge line will be of 60-inch diameter (approximate) steel or equivalent pipe line extending some 11,000 feet by connecting streets from the reservoir to the vicinity of 7th Avenue and Kirkham Streets, where it will connect with the distributing main from Lake Honda reservoir.

The capacity of the distributing reservoirs in San Francisco is now only 135 million gallons which amount is totally inadequate to provide a reasonable margin of safety in the event of a major catastrophe resulting in the rupture of the main transmission line to the City from the Peninsula storage reservoirs. To alleviate this condition is the purpose of the University Mound reservoir and the Sunset reservoir. These with the Central pumps reservoir will add approximately 200 million gallons to the capacity in San Francisco, providing for approximately six days' storage as against 2½ days as at present.

All of the proposed reservoirs are to be covered which will protect the water against algae growths and against pollution, which latter is becoming constantly more of a problem with the growth of the City and the higher standards of purity being established for public water supplies.

Extension to Main Pipe System:

Under this item are grouped a number of improvements and extensions to the City distribution system which may be classed and described to advantage under sub-headings, as follows:

(a) San Andres-University Mound pipe line.
(b) University Mound pipe line.
(c) College Hill pipe line.
(d) Central pumps reservoir.
(e) Secondary mains.
(f) Extensions to Gridiron system.

Taking each sub-item in order:

(a) The San Andres-University Mound pipe line will provide a connection between the San Andres 54-inch pipe line from the vicinity of Junipero Serra Boulevard and Holloway Avenue and the University Mound reservoir outlet pipe where it crosses Crescent Avenue. This line will permit water from the high level or San Andres supply being delivered into the University Mound reservoir or supply system in any emergency.

(b) University Mound pipe line covers the construction of the second and third sections of the new primary supply line from the University Mound reservoir through the south of Market Street industrial area and the down-town business district. The first section of this line was completed in 1931 extending from the reservoir outlet to 25th Street and Potrero Avenue.

The second and third sections will extend the line from that point to Battery and Broadway Streets and will consist of approximately 2840 feet of 42-inch, 10,800 feet of 36-inch and 6560 feet of 30-inch steel pipe or equivalent.

(c) College Hill pipe line contemplates the installation of a new primary supply line from the College Hill reservoir located at Appleton Avenue near Mission Street along Guerrero or adjoining streets to Market Street and thence to the vicinity of Buchanan and O'Farrell Streets. This line will consist of approximately 330 feet of 36-inch, 8690 feet of 30-inch, and 2380 feet of 20-inch diameter steel or equivalent pipe, and 900 feet of 16-inch and 4770 feet of 12-inch cast iron pipe together with necessary valves and fittings.

The University Mound pipe line and the College Hill pipe line supplement the existing supply lines from these reservoirs to the district supplied. The Old University Mound line, 48 years old, is now at times taxed to capacity; the College Hill line is approximately 63 years old and is approaching the limit of its useful life.

(d) Central pumps reservoir contemplates the construction of a small reservoir adjacent to the Central pump station on site now owned by the San Francisco Water Department and originally acquired by the Spring Valley Water Company for that purpose. This reservoir will have a capacity of 8 million gallons. The reservoir with a flow line at elevation 190 would serve as a distributing reservoir for the district between 40th Avenue and the Great Highway and extending from Balboa Street to Sloat Boulevard, all of which lies below elevation 100 and can not be supplied from the University Mound reservoir on account of the intervening topography. The reservoir will also provide regulating capacity for the supply for the Central pumps which pump water into the Stanford Heights reservoir at elevation 614.

(e) Secondary Mains. This item covers the installation of approximately 47,500 feet of 16-inch cast iron pipe, 21,500 of 20-inch and 18,800 feet of 24-inch diameter steel or equivalent pipe necessary to augment the supply to the distributing pipes of the Gridiron System from the mains carrying the primary supply from the distributing reservoirs.

The secondary mains are most essential for improving the fire protection facilities throughout the City. As the City has developed, service has been given to the newer districts by extending the 6-inch and 8-inch mains and smaller pipe, and while these have met the domestic demands in these districts, any heavy draft through fire hydrants can not be sustained. The secondary feeders will provide a direct connection from the primary mains to various points in the network or grid system.

(f) Extensions to gridiron system. This item contemplates the installation of approximately 415,630 feet of 6-inch, 108,295 of 8-inch and 60,270 feet of 12-inch cast iron pipe necessary to replace an equivalent amount of smaller wrought iron or steel pipe 2 inches or less in diameter and to extend service for fire protection purposes into districts now well built up but which are without adequate fire protection. This item also includes the installation of a number of gate valves throughout the distributing system necessary to divide the grid system into smaller sections which may be shut down for emergency purposes without interfering with service to such a large district as is the case under present conditions.

The above-outlined program covers most of the essential major projects to meet our necessities for the next ten years. Aside from these, there are several other projects for which studies have been made which should be given consideration in the ultimate program—one of these is a standby pump station at Lake Merced.

Lake Merced Pump Station:

Lake Merced is no longer utilized as a primary source of supply, but this lake with a capacity of 2½ billion gallons can be made an extremely valuable emergency supply by the installation of a steam pumping plant with capacity sufficient to meet the total City demand, in connection with which pipe line capacity will have to be provided between the pump station and the principal distributing reservoirs to meet the requirements of the several sections of the City. Preliminary estimates place the cost of this project at $1,200,000.

Other Extensions:

With the growth of the City additional distributing reservoir capacity must be provided to maintain a seven day storage in San Francisco. Additional units in the reservoir system contemplated are:

Balboa reservoir, supplementing and perhaps displacing College Hill.
The second unit of the Sunset Heights reservoir.
Glen Park.
Crocker-Amazon.

The normal growth of the city will require addition to our pumping plants, our feeder system and our distributing pipe, and other elements of the system, which will have to be taken care of as the need develops.

Financing Extensions:

Within certain limits, financing of additions and betterments may be made from surplus earnings. The financing from present revenues of a program of extensions designed to meet the requirements of a remote future, places too heavy a burden on the present water consumers. Where such major extensions are financed from bond issues it makes it possible to shift a portion of the financial burden involved to the next generation which will be equally benefited.

The diversion of surplus funds of the Water Department to tax reduction purposes, must necessarily be reflected in continued high water rates. The funds thus diverted from necessary improvements must be otherwise provided, presumably by bond issue, with the result that the water consumer, who through the water rates created the original surplus must again through water rates, provide for the interest and redemption of the bonds.

WATER SALES DIVISION

Gross charges for water sold for the fiscal year 1932-33 amounted to $6,716,695 as compared with $6,929,305 for the fiscal year 1931-32. Deductions for refunds, adjustments and uncollectible bills amounting to $39,614 and $40,238 for the respective years show net water sales of $6,677,081 for the fiscal year 1932-33 against $6,889,067 for the previous year. The decrease of $211,986 amounts to 3.06 per cent.

Sales to residential consumers which had continued to show a steady increase each year up to and including 1931-32, held almost even for the past year; sales to commercial, industrial, shipping and suburban consumers all have shown a steady continuous decrease in volume since 1929-30. Sales to other Municipal departments show a continuous increase each year.

During the fiscal year 1932-33, 923 new services were installed as compared with 1864 for the year 1931-32, and 2039 for 1930-31. This reflects the decreased building activity in the City, the number of building permits issued for the three years in question being respectively as follows: 4,766, 6,111 and 6,463.

The branch bank collection service, inaugurated by the Spring Valley Water Company in 1923 has been extended so that today this service is available to the public at 45 branches of the Bank of America National Trust and Savings Association, 35 branches of the American Trust Company, 9 branches of the Anglo-California Bank, 5 branches of the Hibernia Bank, 4 branches of the San Francisco Bank, and 1 branch of the Bank of California, a total of 99 branch bank collection agencies. Since this service has been available, the number of bills paid at the office has dropped from 17.4 per cent in 1924 to 14.2 per cent in 1932-33. The number of bills handled by the field collectors has been reduced from 114 per man per day in 1924 to 110 per man per day during the past year.

A reduction of rates for automatic sprinkler service was made effective October 26, 1932, by action of the Public Utilities Commission and approved by the Board of Supervisors. This change provided for a uniform service charge of $3.00 per month for all sizes of sprinkler service as compared with the previous graduated charges ranging from $9.00 per month for a 4-inch service to $24.00 per month for an 8-inch service. This rate reduction was reflected in the revenues for the past year to the extent of a reduction of $12,580. The ultimate effect on a full year on the basis of the existing installation will amount to a loss of $26,426. The reduction in rates has not been effective in increasing the number of sprinkler installations, only four new installations having been made during the eight months that the new rates have been in effect.

Following a survey of the accounting system by Lybrand Ross Bros. and Montgomery, the Department is making certain changes in the consumers' accounting methods and procedure, which will effect a material economy in operating expense, and at the same time through better coordination of the several departments aid in carrying out the commission's policy of rendering better service to the consumer. One important change has been the rerouting of the meter reading routes, changing from street routes to block routes, this with a change from the ledger card system to a stub system, and other improvements, will reduce the labor involved and materially reduce the time between the date of reading the meter and the rendering of the bill.

Following are a number of tables and statistics covering the operations of the Water Sales Division for the fiscal years 1931-32 and 1932-33:

NET WATER SALES

All Allowances, Refunds and Losses Deducted

Comparisons—Fiscal Years 1929-30 to 1932-33

Class of Consumers	1929-30	1930-31	1931-32	1932-33
Residential	$2,757,005	$2,822,552	$2,891,703	$2,890,834
Commercial (Incl. Contrs.)	2,944,860	2,924,016	2,858,049	2,721,989
Industrial	455,953	391,608	344,564	307,862
Suspense	4,456*	16,556*	18,440*	19,461*
U. S. Military	12,800	5,365	2,618	4,812
Municipal—Hydrants	187,399	193,961	200,696	204,981
H. P. System	14,092	14,998	13,292	11,865
General	191,408	198,818	211,731	218,290
Total	$ 392,899	$ 407,777	$ 425,719	$ 435,136
Docks and Shipping	151,755	135,799	119,294	103,078
(Total—San Francisco)	$6,710,816	$6,670,561	$6,623,507	$6,444,250
Annual Increase	$ 328,812	$ (40,255)	$ (47,054)	$ (179,257)
Ratio	5.15%	(0.6%)	(0.7%)	(2.7%)
Surburban				
General	$ 312,762	$ 284,472	$ 245,555	$ 212,385
Special Contracts	20,503	16,402	19,645	20,086
U. S. Military	1,013	361	360	360
Total	$ 334,278	$ 301,235	$ 265,560	$ 232,831
Annual Increase	$ 44,928	$ (33,043)	$ (35,675)	$ (32,729)
Ratio	15.5%	(9.88%)	(11.8%)	(12.3%)
System Totals	$7,045,094	$6,971,796	$6,889,067	$6,677,081
Annual Increase	373,740	(73,298)	(82,729)	(211,986)
Percentage	5.6%	(1.04%)	(1.18%)	(3.08%)

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* Suspense Charges formerly included in Commercial and Residential Charges; now shown separately.

Note.—Figures in parentheses indicate loss.

WATER DELIVERIES AT THE CONSUMERS' METERS

San Francisco District

	1929-30	1930-31	1931-32	1932-33
Average Active Accounts	104,118*	106,367	107,708	107,952
Number on June 30	105,379	107,355	108,061	107,843
Metered Delivery—(M.C.F.):				
Residential	712.7	724.6	743.0	740.5
Commercial and Industrial	1,187.8	1,133.8	1,082.9	1,020.3
Municipal	79.5	83.9	90.1	88.1
Docks and Shipping	47.4	40.9	36.3	31.1
Total—(M. C. F.)	2,027.4	1,983.2	1,952.3	1,880.0
Average—(M. G. D.)	41.7	40.8	40.0	38.6
Consumption Rec. (M. G. D.)	49.0	49.8	49.4	46.4
Difference—(M. G. D.)	7.3	9.0	9.4	7.8
Ratio—(M. G. D.)	14.9%	18.1%	19.1%	20.2%

Suburban District

	1929-30	1930-31	1931-32	1932-33
Average Active Accounts	667	658	597	**
Number on June 30	673	643	552	**
Metered Delivery (M. C. F.):				
Regular Rates	134.9	119.6	103.7	88.8
Contract Rates	24.6	20.7	21.8	23.6
Free Deliveries	27.9	22.6	26.1	26.0
Total—(M. C. F.)	187.4	162.9	151.6	138.4
Average—(M. G. D.)	3.9	3.3	3.1	2.8

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* Does not include 968 from County Line.

** Figures not available at time this report was compiled owing to change in Accounting System.

METERS AND KIND INSTALLED AS OF JUNE 30, 1932

(Compiled from Consumers' Card Records)

Revenue and Non-Revenue Producing

San Francisco District

Class of Consumers	⅝" Mtr.	¾" Mtr.	1" Mtr.	1½" Mtr.	2" Mtr.	3" Mtr.	4" Mtr.	6" Mtr.	8" Mtr.	Total
REVENUE PRODUCING:										
Commercial	20,435	998	1,535	1,814	2,032	14	27	109	52	27,016
Residential	80,585	79	484	211	13					81,372
Dock & Ship	141	7	17	13	84	8		2		272
Total	101,161	1,084	2,036	2,038	2,129	22	27	111	52	108,660
NON-REVENUE PRODUCING:										
Commercial	2,417	24	48	36	34		3			2,562
Residential	3,210		2		1					3,213
Dock & Ship				1	5					6
Total	5,627	24	50	37	40		3			5,781
Check Totals	106,788	1,108	2,086	2,075	2,169	22	30	111	52	114,441

NOTE: The above meter count includes 516 batteries composed of 1,362 meters. The above meter count also includes 72 consolidations composed of 197 meters. The above meter count also includes 165 automatic sprinklers for fire purposes. Net metered connections, 113,595.

Suburban District

REVENUE PRODUCING:	⅝"	¾"	1"	1½"	2"	3"	4"	6"	8"	Total
Under Regular Rates	357	20	37	30	121		4	1		570
Under Spec. Contracts	6	2	1	4	16					29
Total	363	22	38	34	137		4	1		599
S/O NON-PRODUCING:										
Under Regular Rates	21	2	6	2	1					32
Under Spec. Contracts	3	3	1	1	15		1			24
Total	24	5	7	3	16		1			56
Totals	387	27	45	37	153		5	1		655

NOTE: The above meter count includes 40 accounts composed of 143 meters (103 meters in excess of accounts). Also 2 Master Meters.

Statistics for the fiscal year 1932-33 are not available at the date of this report.

STATEMENT OF CONSUMERS' ACCOUNTS - CHARGES AND CREDITS
FISCAL YEAR - July 1, 1931 to June 30, 1932

CLASS OF CONSUMERS	BALANCE	REVENUE CHARGES				CREDITS				ADJUSTMENTS		BALANCE
	First of Period	Service Charges	Water Delivered	Misc. Charges	Total Charges	Collections	Allowances	Uncollectible Bills	Total Credits	Refunded O/Crs.& G.O. Adjust.Dr.	Transfers Credit (If Deb.*)	End of Period
RESIDENTIAL	$159,904.81	$ 768,067.41	$2,131,902.02	$	$2,899,969.43	$2,844,025.56	$ 7,744.24	$ 45.40	$2,851,815.20	$1,016.54	$ 17,269.91	$191,805.67
COMMERCIAL	199,335.76	420,557.41	2,443,598.41		2,864,155.82	2,815,579.64	10,717.19	77.60	2,826,374.43	1,123.47	23,687.56	214,553.06
INDUSTRIAL	27,533.82	14,780.57	330,479.78		345,260.35	347,197.19	696.12		347,893.31		103.64	24,797.22
CONTRS.& BLDRS.	1,580.36				8,216.29	6,748.22	7.51	81.31	6,837.04		30.38*	2,989.99
Meter.Service		1,131.49	4,463.04									
Flat Rates				2,621.76								
DOCKS & SHIP.	12,524.15				119,769.36	119,470.52	474.22	.84	119,945.58	.78	1.05	12,347.66
Sh.& Spl.Ser.			53,328.04									
Meter.Service		7,981.68	58,191.73									
Priv.Del.Chgs.				267.91								
SUBURBAN	35,843.07				266,030.52	267,138.54	463.84	2.04	267,604.42	19.16	870.46	33,417.87
Meter.Service		12,683.40	233,702.70									
Priv.Contracts			19,644.42									
TOT.REV.ACCTS (Excl.Mun.Accts)	$436,721.97	$1,225,201.96	$5,275,310.14	$2,889.67	$6,503,401.77	$6,400,159.67	$20,103.12	$ 207.19	$6,420,469.98	$2,159.95	$ 41,902.24	$479,911.47
SUSPENSE ACCTS	19,778.49					12,196.62	413.49	18,016.39	30,626.50	69.14	41,902.24*	31,123.37
TOT.CONS.ACCTS	$456,500.46	$1,225,201.96	$5,275,310.14	$2,889.67	$6,503,401.77	$6,412,356.29	$20,516.61	$18,223.58	$6,451,096.48	$2,229.09	$	$511,034.84
MUNICIPAL - ACTUAL REVENUE AND REVENUE FOR COMPARISON												
MUNICIPAL	$ 32,964.23#	$	$	$	$ 425,902.93	$ 49,344.52	$ 183.82	$	$ 49,528.34	$	$358,490.28	$ 15,079.92#
Hydrants			200,695.60									
St.Cleaning			5,204.81									
Meter.Service		20,007.25	196,720.60									
Fire Boats		115.20	594.77									
Suburban		200.98	2,363.72									
TOTAL MUNIC.	$ 32,964.23#	$ 20,323.43	$ 405,579.50	$	$ 425,902.93	$ 49,344.52	$ 183.82	$	$ 49,528.34	$	$358,490.28	$ 15,079.92#
GRAND TOT.CHGS	$423,536.23	$1,245,525.39	$5,680,889.64	$2,889.67	$6,929,304.70	$6,461,700.81	$20,700.43	$18,223.58	$6,500,624.82	$2,229.09	$358,490.28	$495,954.92
RECAPITULATION												
REVENUE ACCTS (Excl.Mun.Accts)	$436,721.97	$1,225,201.96	$5,275,310.14	$2,889.67	$6,503,401.77	$6,400,159.67	$20,103.12	$ 207.19	$6,420,469.98	$2,159.95	$ 41,902.24	$479,911.47
MUNIC.Rev.	32,964.23#	20,323.43	47,089.22		67,412.65	49,344.52	183.82		49,528.34			15,079.92#
TOT.REV.ACCTS.	$403,757.74	$1,245,525.39	$5,322,399.36	$2,889.67	$6,570,814.42	$6,449,504.19	$20,286.94	$ 207.19	$6,469,998.32	$2,159.95	$ 41,902.24	$464,831.55
MUNIC.COMPARISON (Equal to Mun.Taxes)(Esti)			358,490.28		358,490.28						358,490.28	
SUSPENSE ACCTS	19,778.49					12,196.62	413.49	18,016.39	30,626.50	69.14	41,902.24*	31,123.37
GRAND TOTAL	$423,536.23	$1,245,525.39	$5,680,889.64	$2,889.67	$6,929,304.70	$6,461,700.81	$20,700.43	$18,223.58	$6,500,624.82	$2,229.09	$358,490.28	$495,954.92

#Credit Balances

STATEMENT OF CONSUMERS' ACCOUNTS - CHARGES AND CREDITS
FISCAL YEAR - July 1, 1932 to June 30, 1933

CLASS OF CONSUMERS	BALANCE	REVENUE CHARGES				CREDITS				ADJUSTMENTS		BALANCE
	First of Period	Service Charges	Water Delivered	Misc. Charges	Total Charges	Collections	Allowances	Uncollectible Bills	Total Credits	Refunded O/Crs.& G.O. Adjst.Dr.	Transfers Credit (If Deb.*)	End of Period
RESIDENTIAL	$191,805.67	$ 772,009.55	$2,126,475.13	$	$2,898,484.68	$2,844,517.97	$ 7,309.43	$ 36.49	$2,851,863.89	$ 832.43	$ 26,150.80	$213,108.09
COMMERCIAL	214,553.06	406,273.36	2,327,267.59		2,733,540.95	2,687,228.78	9,156.41	35.07	2,696,420.26	1,111.21	29,296.13	223,488.83
INDUSTRIAL	24,797.22	13,635.35	294,760.41		308,395.76	304,136.21	533.47		304,669.68		233.91	28,289.39
CONTRS.& BLDRS.	2,989.99				3,668.36	3,404.28	12.57		3,416.85	1.80	22.56	3,220.74
Meter.Service		519.57	2,221.25									
Flat Rates				927.54								
DOCK & SHIP	12,347.66				104,062.43	104,479.70	726.16	160.88	105,366.74		12.65*	11,056.00
Sh.& Spl.Ser.			41,626.79									
Meter.Service		8,379.19	53,691.12									
Priv.Del.Chgs				365.33								
SUBURBAN	33,417.87				233,085.46	231,315.62	239.31	.42	231,555.35	14.93	4,170.17	30,792.74
Meter.Service		12,491.60	200,507.80									
Priv.Contracts			20,086.06									
TOT.REV.ACCTS (Excl.Mun.Accts)	$479,911.47	$1,213,308.62	$5,066,636.15	$1,292.87	$6,281,237.64	$6,175,082.56	$17,977.35	$ 232.86	$6,193,292.77	$1,960.37	$ 59,860.92	$509,955.79
SUSPENSE ACCTS	31,123.37					17,308.95	478.75	18,980.59	36,768.29	143.49	57,622.71*	52,121.28
TOT.CONS.ACCTS.	$511,034.84	$1,213,308.62	$5,066,636.15	$1,292.87	$6,281,237.64	$6,192,391.51	$18,456.10	$19,213.45	$6,230,061.06	$2,103.86	$ 2,238.21	$562,077.07

MUNICIPAL - ACTUAL REVENUE AND REVENUE FOR COMPARISON

CLASS OF CONSUMERS	Balance First of Period	Service Charges	Water Delivered	Misc. Charges	Total Charges	Collections	Allowances	Uncollectible Bills	Total Credits	Refunded O/Crs.& G.O. Adjst.Dr.	Transfers Credit (If Deb.*)	Balance End of Period
MUNICIPAL	$ 15,079.92#	$	$	$	$ 435,457.88	$ 85,217.01	$ 321.81	$	$ 85,538.82	$	$358,496.28	$ 23,657.14#
Hydrants			204,980.60									
St.Cleaning			6,170.64									
Meter.Service		22,195.35	198,451.53									
Fire Boats		115.20	538.54									
Suburban		202.77	2,803.25									
TOTAL MUNIC.	$ 15,079.92#	$ 22,513.32	$ 412,944.56	$	$ 435,457.88	$ 85,217.01	$ 321.81	$	$ 85,538.82	$	$358,496.28	$ 23,657.14#
GRAND TOT.CHGS.	$495,954.92	$1,235,821.94	$5,479,580.71	$1,292.87	$6,716,695.52	$6,277,608.52	$18,777.91	$19,213.45	$6,315,599.88	$2,103.86	$360,734.49	$538,419.93

RECAPITULATION

CLASS OF CONSUMERS	Balance First of Period	Service Charges	Water Delivered	Misc. Charges	Total Charges	Collections	Allowances	Uncollectible Bills	Total Credits	Refunded O/Crs.& G.O. Adjst.Dr.	Transfers Credit (If Deb.*)	Balance End of Period
REVENUE ACCTS (Excl.Mun.Accts)	$479,911.47	$1,213,308.62	$5,066,636.15	$1,292.87	$6,281,237.64	$6,175,082.56	$17,977.35	$ 232.86	$6,193,292.77	$1,960.37	$ 59,860.92	$509,955.79
MUNIC. REV.	$ 15,079.92#	21,221.13	55,746.47		76,967.60	85,217.01	321.81		85,538.82		6.00	23,657.14#
TOT.REV.ACCTS.	$464,831.55	$1,234,529.75	$5,122,382.62	$1,292.87	$6,358,205.24	$6,260,299.57	$18,299.16	$ 232.86	$6,278,831.59	$1,960.37	$ 59,866.92	$486,298.65
MUNIC.COMPARISON (Equal to Mun.Taxes)(Esti)		1,292.19	357,198.09		358,490.28						358,490.28	
SUSPENSE ACCTS.	31,123.37					17,308.95	478.75	18,980.59	36,768.29	143.49	57,622.71*	52,121.28
GRAND TOTAL	$495,954.92	$1,235,821.94	$5,479,580.71	$1,292.87	$6,716,695.52	$6,277,608.52	$18,777.91	$19,213.45	$6,315,599.88	$2,103.86	$360,734.49	$538,419.93

#Credit Balances

GROSS METERED SERVICE REVENUES, SERVICE CHARGES AND SPECIAL SERVICE REVENUES; ALSO RECORD OF REFUNDS, ALLOWANCES, ADJUSTMENTS, COLLECTIONS AND BALANCES DUE

Comparisons—Fiscal Years 1929-30 to 1932-33

METERED SERVICE				
Standard Rates	1929-30	1930-31	1931-32	1932-33
Residential	$2,779,118	$2,831,871	$2,899,970	$2,898,485
Commercial (Incl. Contrs.)	2,977,111	2,938,119	2,869,750	2,736,282
Industrial	456,844	391,727	345,260	308,396
Suspense	*	*	*	*
Municipal	205,557	213,913	225,207	230,477
Docks	77,584	69,293	66,174	62,070
Suburban	316,429	285,054	246,386	212,999
Total	$6,812,643	$6,729,977	$6,652,747	$6,448,709
For Water Delivered	$5,618,808	$5,504,424	$5,407,221	$5,212,887
Ratio	82.5%	81.8%	81.3%	80.8%
Service Charges	1,193,834	1,225,553	1,245,526	1,235,822
Ratio	17.5%	18.2%	18.7%	19.2%
SPECIAL SERVICE				
Fire Hydrants (S. F.)	$ 187,399	$ 193,961	$ 200,696	$ 204,981
Contractors—Flat Rates	4,874	3,217	2,622	927
Shipping—Hose Truck	74,826	67,287	53,596	41,992
Suburban—Special Contracts	20,503	16,402	19,644	20,086
Total	$ 287,602	$ 280,867	$ 276,558	$ 267,986
TOTAL GROSS CHARGES	$7,100,245	$7,010,844	$6,929,305	$6,716,695
DEDUCTIONS:				
Cash Refunds	$ 3,849	$ 1,156	$ 1,314	$ 1,623
Allowances and Adjustments	21,462	20,911	20,700	18,778
Profit and Loss	29,740	16,981	18,224	19,213
Total	$ 55,151	$ 39,048	$ 40,238	$ 39,614
Net Sales	$7,045,094	$6,971,796	$6,889,067	$6,677,081
Collections	6,988,655	6,715,978	6,461,701	6,277,609
Balances due on Cons. Accts.	533,304	423,536	495,955	538,420

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* Suspense Charges formerly included in Commercial and Residential Charges. Now shown separately.

WATER SALES DIVISION EXPENSE

Comparisons for Fiscal Years 1930-31 to 1932-33

OPERATING ACCOUNTS:	1930-31	1931-32	1932-33
General (Incl. sick leave)	$ 34,971	$ 33,531	$ 41,777**
Service and Supply	47,064	42,366	40,202
Meter Reading	38,202	38,519	35,276
Bookkeeping and Adj.	112,869	109,031	111,030†
Collections	93,044	100,399	100,218
Cons. Premises	14,253	12,955	12,819
Docks and Shipping	15,179	14,743	14,309
Office Equipment	67	109	0
Automobile Equipment	0	0	0
TOTALS	$355,649	$351,653	$355,631**†

CLASS OF EXPENSE:			
Salaries	$295,639	$294,890	$285,571
Supplies and Miscellaneous	8,996	8,510	13,297†
Postage	13,900	13,096	19,755**
Auto Maintenance and Operation	6,558	10,265	10,913
Carfares, etc.	2,413	2,536	2,720
Shop Charges	3,675	1,148	310
Dock Rentals	3,720	3,720	3,720
Dock Deliveries	572	376	371
Subscrip. Bank Col., etc.	15,131	16,384	18,974
Equipment Expense	67	109	0
Suburban	4,978	619	—
TOTALS	$355,649	$351,653	$355,631**†

GROSS SALES:			
San Francisco District	$6,709,494	$6,663,274	$6,483,611
Expense Ratio	5.30%	5.28%	5.48%
Average Cons. Accts.	106,367	107,708	*
Monthly Cost per Acct.	28.0¢	27.2¢	*

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* Figures not available at time this report was completed owing to change in accounting system.

** Postage increase $6,659—change 2¢ to 3¢.

† Includes $5,324 on account of installation of new system.

STREET MAIN TAPS AND SERVICE CONNECTIONS RECORD

San Francisco District, June 30, 1932

Taps on Street Mains

	Wharf	¾″	1″	1½″	2″	3″	4″	6″	8″	Totals
June 30, 1931	252	120,259	2,733	2,576	1,878	513	223	141	47	128,622
New Tps. Fis. Yr.	2	1,392	84	53	22	16	6	10	6	1,591
June 30, 1932	254	121,651	2,817	2,629	1,900	529	229	151	53	130,213

Service Connections

	Services connected to street mains, as above	130,213
ADD	"Distributors," being one or more additional meter connections to main service pipes for stores, etc.	8,401
	Total connections of record	138,614
DEDUCT	Discontinued services (partly estimated)	24,173
	Net live services, all metered—active, 108,660; temp'y S/O 5,781	114,441

Previous Records:	1928-29	1929-30	1930-31
Active	102,829	106,014	107,538
Shut-off	5,426	5,526	5,489
TOTALS	108,255	111,540	113,027

Service Installations

Fiscal Year 1931-32

District:	Taps	Distributors	Total
Richmond District	106	6	112
Sunset	767	27	794
North Market and West. Add.	155	135	290
South Market and Twin Peaks	561	105	666
Waterfront	2	0	2
Totals	1,591	273	1,864
PREVIOUS YEARS:			
1928-1929	2,116	388	2,506
1929-1930	1,423	269	1,692
1930-1931	1,756	303	2,059

STREET MAIN TAPS AND SERVICE CONNECTIONS RECORD

San Francisco District, June 30, 1933

Taps on Street Mains

	Wharf	¾″	1″	1½″	2″	3″	4″	6″	8″	Totals
June 30, 1932	154	121,651	2,817	2,629	1,900	529	229	151	53	130,213
Add 1932-33	11*	604	44	19	10	9	2	9	1	687
June 30, 1933	243	122,255	2,861	2,648	1,910	538	231	160	54	130,900

Service Connections

	Services connected to street mains, as above	130,900
ADD	"Distributors," being one or more add'l meters con. to service pipes	8,637
	Total connections of record	139,537
DEDUCT	Disconnected services (partly estimated)	**
	Net live services, all metered	**
	Active temporary S/O	**

Previous Records:	1929-30	1930-31	1931-32
Active	106,014	107,538	108,660
Shut-off	5,526	5,489	5,781
Totals	111,540	113,027	114,441

** Figures not available at time this report was compiled owing to change in accounting system.

Service Installations

Fiscal Year 1932-33

District:	Taps	Distributors	Total
Richmond District	26	11	37
Sunset District	272	13	285
North Market and West. Add.	114	106	220
South Market and Twin Peaks	286	106	392
Waterfront	11*	0	11*
Totals	687	236	923

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* Deducted.

PREVIOUS YEARS:

1929-1930	1,423	269	1,692
1930-1931	1,756	303	2,059
1931-1932	1,591	273	1,864

Automatic Sprinkler Installations

October 26, 1932-June 30, 1933

4″	6″	8″
1	2	1

RECORD OF "BAD WATER" COMPLAINTS

Comparisons of Complaints Received During the Fiscal Years 1929-30 to 1932-33, With Reference to the Reservoirs Supplying

	1929-30	1930-31	1931-32	1932-33
University Mound	439	413	346	257
College Hill	50	373	90	88
Lake Honda	1,710	1,200	792	414
Forest Hill	20	23	30	7
Claremont and Stanford Hts.	52	384	159	88
Clay and Presidio Hts.	17	310	131	31
TOTALS	2,288	2,703	1,548	885

RECORD OF "NO WATER" COMPLAINTS

Fiscal Years 1929-30 to 1932-33

(a) *Those for which Department was Responsible.*				
Choked pipes	255	202	148	211
Service or main broken	97	81	58	102
Service or main too small	138	92	75	61
Elevation too high	47	46	44	28
S/O at main or meter	31	39	44	43
District temporary S/D	51	54	35	28
TOTALS	619	514	404	473
Percentage	43.5%	45.1%	40.7%	44.5%
(b) *Those for which Consumers were Responsible.*				
House valves closed	267	250	226	215
House pipe too small	81	45	45	28
False reports	148	137	156	156
Valves out of order	270	180	148	169
House pipe broken	25	9	14	16
Building too high	12	4	1	2
Overloaded service	—	—	—	4
TOTALS	803	625	590	590
Percentage	56.5%	54.9%	59.3%	55.5%
Total "No Water"	1,422	1,139	994	1,063

RECORD OF BUILDING PERMITS

Issued by the Board of Public Works During the Fiscal Years 1929-30 to 1932-33

	1929-30	1930-31	1931-32	1932-33
Class "A"	$ 5,454,860	$ 2,167,140	$ 903,000	$ 637,400
Class "B"	2,792,474	1,341,840	592,000	210,800
Class "C"	3,571,743	2,299,939	964,478	416,163
Frames	7,447,091	8,138,537	5,965,534	2,530,243
Alterations	4,191,989	2,898,518	2,107,049	2,054,234
Public buildings	1,804,759	4,385,446	2,879,741	19,414,988
U. S. Government	1,202,677	591,907	208,103	2,486,718
State buildings	1,545,000	1,031,424	688,531	31,916,146
TOTALS	$28,010,593	$22,854,751	$14,308,436	$59,666,692

NUMBER OF BUILDING PERMITS

Issued by the Board of Public Works During the Fiscal Years 1929-30 to 1932-33

	1929-30	1930-31	1931-32	1932-33
Class "A"	16	11	8	7
Class "B"	25	20	7	7
Class "C"	121	147	96	60
Frames	1,418	1,803	1,477	682
Alterations	5,199	4,443	4,425	3,929
Public buildings	11	17	53	33
U. S. Government	2	17	29	28
State buildings	5	5	16	20
TOTALS	6,797	6,463	6,111	4,766

NUMBER OF CONTRACTORS' JOBS HANDLED BY THE BUILDERS' AND CONTRACTORS' SUPPLY SECTION

Totals during the Fiscal Years

1929-30	1,923
1930-31	1,730
1931-32	1,606
1932-33	1,015

AGRICULTURAL DIVISION

Lands under control of the Water Department and owned in fee as of June 30, 1933, aggregate 62,857 acres, 48 acres less than the area shown as of June 30, 1932. The difference is accounted for as follows:

Parcel No. 14	.273 acres	San Francisco Co., sold for	$12,000
Parcel No. 22	7.021 acres	San Francisco Co., sold for	35,000
Parcel No. 8	.245 acres	San Mateo Co., sold for	9,078
Parcel No. 69	2.18 acres	Alameda Co., sold for	3,180*
Total sales fee	9.719 acres		$59,258
Total sales right of way		Alameda and San Mateo Co.	16,570
Total sales fee	9.719 acres		75,828
Used for boulevards, etc	34.229 acres		
Correction previous report	4. acres		
Total change	47.948 acres		

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* Money held in escrow on account of defect in title.

Of the aforesaid 62,857 acres, there are at present 35,070 acres under lease as compared with 36,870 acres a year ago.

Following is a summary showing the number of the different types of leases in effect during the past two fiscal years:

	1931-32	1932-33
Nominal leases to employees	16	13
Nominal leases to others	5	3
Leases for taxes only	1	1
Leases for cash only	124	122
Leases for cash and taxes	4*	5
Leases for part cash and part share crop	8	8
Leases for share crop only	21	22
TOTAL	179	174

The yearly amounts accruing under these leases are divided as follows:

	1931-32	1932-33
Nominal	21	16
Less than $100	79	75
$100 to $500	49	48
$500 to $1,000	13	22
$1,000 and over	17	13
TOTAL	179	174

	1931-32	1932-33
Total cash rentals aggregate	$54,196.84**	$57,878.58***
Total share crop rentals	5,854.67	8,738.28
Total taxes paid by tenants	2,717.85	2,511.01
TOTAL	$62,769.36	$69,127.87

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* Does not include taxes on Harding Golf Course.

** Includes $10,000 due from Park Commission for Harding Golf Course.

*** Includes $12,000 due from Park Commission for Harding Golf Course.

The following tabulation gives a general distribution of the lands leased, number of tenants, and the rentals in the several districts for the past two fiscal years.

SUMMARY

1931-32

Lands in Alameda & Sta. Clara Counties	Total Acreage	Leased Acreage	No. of Tenants	RENTALS Cash	RENTALS Share Crop
Sunol District: Parcels 60-65 and 73-88	36,210	32,310	22 cash 15 share crop 5 nominal	$21,662.50	$3,753.78
Pleasanton District: Parcels 66-72	913	800	11 cash 14 share crop 1 nominal	1,975.75	2,100.89
Niles District: Parcels 48-59	743	334	43 cash 2 nominal	1,703.00	
	37,866	33,444	113		
San Mateo County Watershed Lands: Parcels 31-33	22,746	2,688	6 nominal 4 cash 1 taxes	4,468.10 1,613.99	
	60,612	36,132	124	$31,423.34	$5,854.67
San Mateo County Outside Watershed: Parcels 1-30	1,037	500	28 cash and taxes 1 nominal	6,041.39 13.19	
San Francisco: Parcels 1-64	963	238	20 cash and taxes 6 nominal	18,346.10 1,090.67	
TOTALS	62,612	36,870	179	$56,914.69	$5,854.67

	Acres
Lands in Alameda and Santa Clara Counties (as shown above)	62,612.000
Hetch Hetchy Bay Division:	
Alameda County	84.308
San Mateo County	204.178
Outside of Rights of Way	4.408
GRAND TOTAL	62,904.894

SUMMARY

1932-33

Lands in Alameda & Sta. Clara Counties	Total Acreage	Leased Acreage	No. of Tenants	Cash	Share Crop
Sunol District: Parcels 60-65 and 73-88	36,213	32,347	44	$17,760.62	$4,672.50
Pleasanton District: Parcels 66-72	911	797	19	1,816.40	4,065.78
Niles District: Parcels 48-59	743	445	47	1,813.75	
	37,867	33,589	110		
San Mateo County					
Watershed: Parcels 31-33	22,746	727	13	3,906.99	
Outside Watershed: Parcels 1-30, 34-47a, and Lake Merced	1,072	487	28	5,127.58	
San Francisco County Parcels 1-64	879	238	21	29,244.25	
Hetch Hetchy rights of way in Alameda and Santa Clara Counties	293	29	2	720.00	
TOTAL	62,857	35,070	174	$60,389.59	$8,738.28

Of leases taken over by the Water Department from the Spring Valley Water Company, nineteen are still active—thirteen being employees' leases covering homes on the properties, one a month to month lease for Parcel 31—San Francisco County Lands, the remaining five being long-term leases, as follows:

1. City and County of San Francisco, Park Commission, for Harding Golf Course, expires June 30, 1937.
2. Crystal Springs Country Club, expires Sept. 30, 1940.
3. Empire Mines & Investment Co., expires Nov. 9, 1970.
4. Municipal Properties Company, expires Oct. 12, 1940.
5. The Olympic Club, expires May 31, 1941.

No payments have ever been received from the Park Commission for the Harding Golf Course, which, including the amount due July 1, 1933, amount to $41,967.80. In addition to this rental, the lease provides that the lessee shall pay all taxes and assessments. No adjustment of this item has ever been made.

The Crystal Springs Country Club has had a difficult time during the depression, through loss of members, to meet its financial obligations to the

Department in the way of taxes and water bills which latter average approximately $8,000 per year. To prevent the abandonment of this lease and avoid the maintenance expense which might fall on the Department pending obtaining a new tenant, an agreement dated April 1, 1933, was entered into between the Public Utilities Commission and the Club, amending the lease insofar that the Club executed a grant of all its buildings and personal property to the City, which grant was placed in escrow. Under the terms of said agreement, the Water Department is to furnish all necessary water to the Club for its use and upkeep for a period of three years from date of agreement, the cost of such water with interest at 6 per cent to be repaid to the City within said three years, whereupon the aforesaid grant shall be returned to the Club and the original lease shall continue in full force and effect.

In the event that the Club shall not pay the full amount of such water bills at the end of said three-year period, it may continue in possession on a month to month basis by paying to the City a cash rental of $250 per month, in lieu of taxes, together with the full amount of all water bills accruing monthly thereafter up to September 30, 1940; provided, that if such payments are not completed on or before the 25th day of the following month, all rights of the Club shall be terminated forthwith and the grant of personal property aforesaid shall immediately be delivered to the City.

Payment by the Club of the taxes as rental shall continue during the said three years as in the original lease, and all other terms and conditions shall also remain the same, and the Club shall be fully reinstated in the original lease at any time up to September 30, 1940, by full payment of its obligations to the City.

The Municipal Properties Company has been defunct for several years and all taxes and rentals have been paid by the San Francisco Bank. The Bank has the option of taking over the lease should the Municipal Properties Company default but, so far, it has been impossible to secure any settlement although the matter was referred to the City Attorney.

Reduction in Rentals:

Rental charges originally established for Department lands used for agricultural purposes were based on the high prices of agricultural products during the war and subsequently. With the depression and the prevailing low prices for agricultural products, these rentals could not be paid by tenants out of proceeds with any profit to themselves so, in response to a general demand and in line with the policy adopted by private owners in similar situation, the Public Utilities Commission authorized, by resolution, a reduction of 15 per cent in rental on some twenty-five agricultural leases on which the total annual rentals had been $16,920.50, resulting in a reduction of annual revenue of $2,528.08.

A temporary reduction in rental from $125 to $50 per month in connection with the lease of a certain portion of the Balboa reservoir site, used as a practice golf course, made necessary by the condition of the business, was also authorized.

The lease of the Calaveras Range, bringing $6,000 per year, was cancelled under option of the tenant as of October 31, who was unable to justify the rental on account of the low price of cattle. Open bids for this range subsequently effected a new lease at $4,755 per year. This new lease has a provision, however, under which the rental charge will automatically be increased with an increase in the selling price of cattle above a base price of 5¾ cents per pound.

Other leases terminated were those of the Pacific Coast Aggregates Company, amounting to $1,134 per year, and the Spring Valley Company, Ltd., lease of certain Peninsula lands, amounting to $2,000 per year.

Further revenue reductions resulted from the sale of certain revenue producing properties as Parcels Nos. 14 and 22 in San Francisco County and No. 8 in San Mateo County; also by the construction of the Sunset and Lake Merced Boulevards, and parking space on Lake Merced ranch.

Aggregate reductions in rentals during the past year will amount to $8,050.

Rental Collections:

Considering the financial conditions during the past two years, the rental collections are regarded as satisfactory. The amount outstanding as of June 30, 1932, was $6,163.35 and as of June 30, 1933, $7,697.95, exclusive of any amount due from the Park Commission for the use of Harding Park Golf Course. The greater portion of the outstanding rents at the close of each fiscal year is paid as cattle is sold. Doubtful accounts amount to less than $850, most of which is protected by improvements on the property.

Share Crop Rentals:

The winter of 1930-31 proved to be dry, following three previous seasons of subnormal precipitation. Crops were therefore unsatisfactory both in quality and quantity, and in addition, prices of all farm products suffered a material reduction as compared to the previous year. As a result, the return from share crop rentals for the fiscal year 1931-32 amounted to $5,072.62, as compared with $11,791.88 in the previous year.

The season of 1932 proved to be one of average production, but the prices of all agricultural products were the lowest in many years. The returns for share crop rentals for the 1932-33 fiscal year amounted to $8,865.58.

Difficulty was experienced in disposing of the 1931 crop. A small portion of the hay and grain was used by the Department and some sold to other City Departments.

This last year the Department entered the low bid to the City for furnishing hay, grain and straw for the various departments.

Under arrangement with the Purchaser of Supplies, crops not required for other departments, or of poor quality, are disposed of at the best price obtainable in the open market.

Use of Lands Not Leased:

The depression has precluded any chance of making use of certain of these properties which might be attractive under favorable conditions. A complete list of Department properties not required for water supply purposes has been prepared showing cost, assessed value, etc., in event that disposal of any of said parcels may be considered at any time. In connection with this, a fund has been established by ordinance into which proceeds of any department land sales are deposited and which may be used only for the purchase of other lands required by the Department.

Of the 27,787 acres of land not leased, 21,973 acres lie in the Peninsula watershed, including the reservoir area; 3752 acres are in the Calaveras reservoir, creek beds, walnut orchard, etc., in the Sunol district; 410 acres in the steep slopes of Niles Canyon and the Dumbarton right of way; 105 acres of Pleasanton and Laguna Creek lands in channels, etc.; 547 acres in tidelands, pumping stations and miscellaneous parcels in San Mateo County; 721 acres in Lake Merced, City reservoirs, pump stations and miscellaneous parcels in San Francisco County; 279 acres in Hetch Hetchy rights of way in Alameda and San Mateo Counties.

Walnut Orchard:

The very dry spring of 1931 made it absolutely essential that the walnut orchard be irrigated, and this was done in June of that year, which was particularly fortunate in view of the unusually hot weather during the early part of July.

Prospects for normal crop were favorable up to that time. The heat caused a large measure of damage throughout the State, and crops were reduced from 20 to 35 per cent. This condition added materially to the cost of harvesting as it was necessary to cull out damaged nuts in the field. From an estimated crop of 60 tons we delivered 45¾ tons to the packing house, which packed out 52 per cent Diamond brand, 35 per cent Emerald and Babies and 13 per cent culls and blows, as compared to the 1930 crop of nearly 76 per cent Diamond brand, nearly 20 per cent Babies and 4 per cent culls and blows.

Prices fixed by the California Walnut Growers Association in 1931 averaged about 4 cents per pound lower than in 1930. The gross returns from the Association were about $13,800 (final payment for culls estimated at $120) as compared to $23,937.05 in 1930. The Association costs in 1931 were materially reduced as there was no building assessment of $7.50 per ton as in previous years (the building and grounds having been paid for in full and belonging to the Association without encumbrances). Also, the selling cost was 5 per cent in 1931 as compared to 10 per cent in 1930 due to the limited crop in the latter year and the rapidity with which it was disposed of.

The infestation of oyster shell scale has been practically eliminated by cutting out willow and poplar trees where same were in close proximity to walnut trees.

SUNOL WALNUT ORCHARD
Franquette trees in bearing, planted 20 years ago by F. W. Roeding, Superintendent of the Agricultural Division, in the foreground.

The season of 1932 was a banner year both for quantity and quality of the walnuts produced. The entire season was unusually favorable except for the early spring frosts which made smudging necessary six times.

Our total yield was 206,795 pounds as compared to 91,570 pounds in 1931 and 110,361 pounds in 1930. The greatest previous yield was in 1928 when a crop of 142,120 pounds was harvested. The 1932 crop excelled all previous known records as to quality. Several loads of walnuts delivered, under crack test went 100 per cent Diamond quality. Not a single load was under 97 per cent Diamonds. The entire crop packed out "Diamond Brand" which is the highest quality. Comments on this occurrence were noted in agricultural and other papers in Southern and Central California.

Due to the depression, the Association cut the price to 17 cents per pound for "Large Diamond," as compared to 21 cents in 1931 and 25 cents in 1930. The gross returns for the past season will be about $29,000.

Early last summer it was realized that storage bins in the dehydrator plant were necessary in order to increase its capacity. This necessitated a change in the mechanical equipment. The bins are located over the dehydrator and were constructed out of second-hand lumber from supplies on hand, the labor being performed by the Agricultural Division employees. This change increased the storage capacity inside the building to 14 tons and permitted the running of the dehydrator continuously to capacity, as it is now possible to fill the drying bins promptly as soon as they are emptied.

Another innovation this past season was contracting the walnut picking. Bids were advertised and contract awarded to C. H. Schween & Son of of Pleasanton at $51.00 per ton. The contract included picking the walnuts and delivering them to the dehydrator, furnishing a night operator for the plant, and hauling the walnuts from the dehydrator to the Association packing house at Walnut Creek.

Diseases and Pests:

The winter spraying of the orchard with oil emulsion has kept the trees in good condition in so far as scale insects are concerned and should be continued as the expense is not great and the benefits have been very obvious. Diseases which are being successfully treated are "crown gall" or "black knot" and "small leaf," the former by exposing the affected portion to the air, cutting out the diseased growth and painting with a Bordeaux paste, and the latter by treating the soil near the affected trees with zinc sulphate. A small portion of the orchard is affected each year with "nut blight," but this has never been sufficiently serious to require treatment. "Morning glory" was at one time a serious pest, but weed cutting brought it under control and, except for a small area in the easterly portion of the orchard, the growth is scattered and limited to occasional plants. Leaf aphis, although present, has been and is being destroyed by numerous parasites, consisting of several species of lady bugs and flies. This season less than half the orchard required one dusting with nico dust and, possibly, with the increase of parasites, no further dusting will be necessary. However, experience has taught that, with the decrease in food supply for these parasites, they also disappear and then there is liable to be a large increase in the host. Meloxuma has been present on a few trees in the past but treatment with Bordeaux paste, after cutting out the diseased portion, has proven successful. The above is cited to explain the vigilance necessary to keep the orchard in good condition and insure crops of both quality and quantity.

Other Activities:

During the fiscal year 1931-32 Mr. Roeding cooperated with the Director of Property in making an independent investigation and an appraisal of the Corral Hollow Pipe Line right of way in Alameda county. He also was called upon to make appearances as an expert witness for the City in two condemnation suits in connection with the San Lorenzo-Newark Pipe Line right of way, viz., Ramos Bros. et al. in the Superior Court of Santa Clara County at San Jose, and Alameda County Water District in the Superior Court of Alameda County at Oakland; also, in the damage suit of Mrs. H. F. Bracher vs. City and County of San Francisco on account of water released from the Irvington Portal of the Hetch Hetchy tunnel, tried in the Superior Court of Alameda County at Oakland.

During the year 1932-33, appearance was made as expert witness for the City in the Superior Court of Santa Clara County in the condemnation suit of the City vs. A. W. Haley on account of the San Lorenzo-Newark Pipe Line right of way; also, at the request of the Director of Property, reports on crop damage on account of street and sewer construction were made.

A detailed list of all properties of the San Francisco Water Department, showing costs, was prepared and submitted to the Director of Property. This list showed valuations placed on the properties acquired previous to 1920 by the California Railroad Commission as of March 1, 1920, also, all charges and credits to Real Estate Account made by the Spring Valley Water Company from March 1, 1920, to March 3, 1930.

Fences and Boundary Lines:

Under the budget allowance for 1931-32, for this purpose, sufficient material was purchased in December last which, together with the fencing material on hand from the previous year, was sufficient for about six miles of property lines. As existing fences on supposed boundaries could not be relied upon, a number of surveys were run by a party under Mr. H. R. Brooks, resulting in setting corners on about 10½ miles of boundary lines near Sunol. Additional surveys in that vicinity amounted to another mile. The difficulties experienced and the various title investigations made are embodied in a report by Mr. Brooks filed for future reference. The cost of this survey amounted to $3,233.47 or, approximately, $281 per mile on about 11½ miles of distance. It is important that this work be continued until all boundary lines of properties in Alameda and Santa Clara Counties are determined and monumented. The plan for fencing the outside boundary was continued, as in the previous year, namely, of arranging with adjacent property owners to furnish the labor, the Department furnishing the material. Under a contract with Frank E. McBain, 11,088 feet of fencing was constructed along the westerly high water line of Calaveras reservoir in Santa Clara County to keep cattle from entering the lake, the high water having submerged the old fences. This latter line, including all material and labor, was constructed for $0.053 per foot and consisted of four strands of barbed wire, redwood posts at intervals of 24 feet with two redwood pickets between posts. The entire cost to the Department for all fencing during the past fiscal year—a distance of 27,966 feet—was $1,357.71, or an average cost per foot of $0.0485.

Financial conditions did not permit making any allowance for this purpose in the 1932-33 budget and as a consequence a continuation of surveys of the boundary lines in Alameda and Santa Clara Counties was not permitted during the past fiscal year. The Alameda Division maintenance crew constructed a fence along the easterly line of the Calaveras reservoir from the end of the steel post and wire fence on the Sierra-Marsh Road to a point near the junction of Calaveras and La Honda Creeks—this was necessary to keep cattle out of the reservoir site. Much of the old fencing had been destroyed by the high water in 1932.

Many of the boundary fences are in very poor condition, being of light construction and long past their usefulness. Before replacing these fences surveys must be made to establish the lines which are in most cases at present indefinite.

RETURNS AND EXPENSES

Returns

	1930-31	1931-32	1932-33
Cash rentals accrued	$47,072.00	$39,119.42	$50,189.34*
Taxes paid by tenants	2,783.73	2,717.85	2,511.01
Share crop rentals	11,791.88	5,072.62	8,865.58
Walnut orchard sales	23,910.64	13,617.67	28,982.12
	$85,558.25	$60,527.56	$90,548.05

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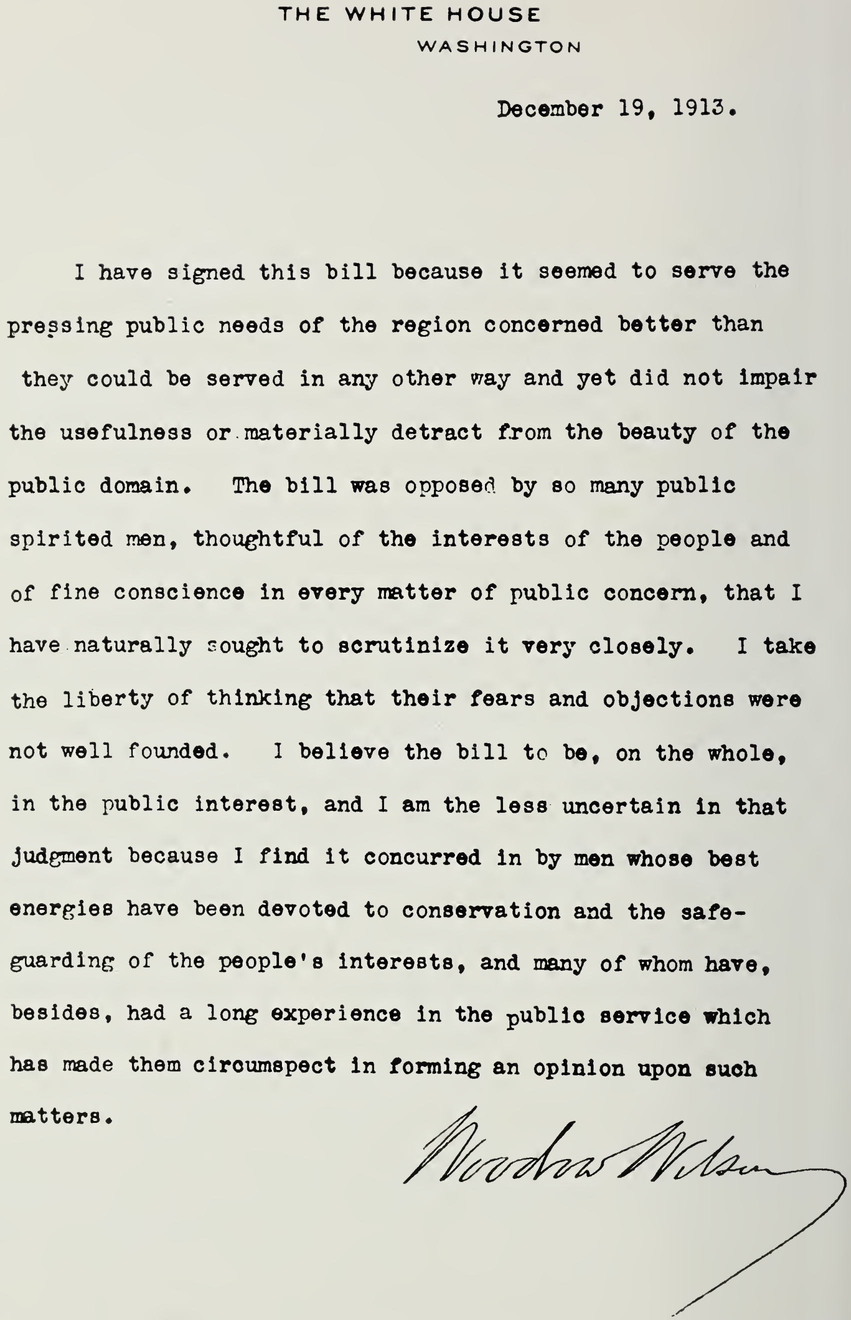
* Includes unpaid rentals accrued in 1931-32 to the extent of $6,041.25.

Expenses

GENERAL:	1930-31	1931-32	1932-33
Salaries	$11,580.00	$11,970.79	$11,333.81
Office and miscellaneous	179.46	323.16	404.16
Automobile service, depreciation, etc.	1,573.61	1,151.57	1,543.39
Hay and grain account—storage, insurance, handling, freight, etc.	2,414.60	463.30	2,417.94
Care of properties—repairs to fences, repairs to buildings, rodent control, etc.	1,792.27	1,148.51	2,762.65
New fence construction	458.31	1,222.03	
Surveys		3,233.47	
Walnut Orchard:			
Crop harvest	4,409.73	4,509.30	5,849.56
Packing house and selling expense	3,880.89	1,508.79	5,967.64
Care of orchard	3,173.69	6,038.76	**8,288.85
	$29,462.56	$31,569.68	$38,568.00

** Care of orchard expense for 1931 during November and December, amounting to $1,443.42, was added to 1932 expense on account of the poor crop conditions in the former year. Also in this expense for 1932 is the cost of construction of the overhead bins in the dehydrator building and the change in equipment necessitated thereby, $900. The added cost of crop harvest and packing house charge in 1932 is naturally due to the large crop. These various items increase the total cost as compared with the two previous years shown by about $6,000.



THE WHITE HOUSE
WASHINGTON

December 19, 1913.

I have signed this bill because it seemed to serve the pressing public needs of the region concerned better than they could be served in any other way and yet did not impair the usefulness or materially detract from the beauty of the public domain. The bill was opposed by so many public spirited men, thoughtful of the interests of the people and of fine conscience in every matter of public concern, that I have naturally sought to scrutinize it very closely. I take the liberty of thinking that their fears and objections were not well founded. I believe the bill to be, on the whole, in the public interest, and I am the less uncertain in that judgment because I find it concurred in by men whose best energies have been devoted to conservation and the safeguarding of the people's interests, and many of whom have, besides, had a long experience in the public service which has made them circumspect in forming an opinion upon such matters.

Woodrow Wilson

On December 19, 1913, President Woodrow Wilson approved and signed the Raker Act, an enactment of The Congress granting San Francisco its Hetch Hetchy rights on the Tuolumne River. President Wilson then prepared and signed the memorandum reproduced in facsimile above, explaining his attitude toward the project.

HETCH HETCHY WATER SUPPLY CONSTRUCTION

L. T. McAFEE
Chief Engineer

Fiscal Year Ended June 30, 1932
and
Fiscal Year Ended June 30, 1933

HETCH HETCHY POWER OPERATIVE DIVISION

Fiscal Year Ended June 30, 1932

(The report of the Hetch Hetchy Power Operative Division for the fiscal year ended June 30, 1933, will be found in this volume immediately following the present section.)

Progress and Development:

The development during the two-year period ending June 30, 1933, is briefly summarized as follows:

The requirements of the Department of the Interior as to the construction of roads and trails in Yosemite National Park were satisfied by completion of the Rancheria Mountain trail in 1931 and reconstruction of the Mather-Hetch Hetchy road completed in 1932.

Water from the mountain reservoirs was brought to Tesla Portal, 97 miles from O'Shaughnessy Dam, in September 1932, by completion of the Red Mountain Bar pipe and the San Joaquin Valley pipe.

The Corral Hollow emergency pipe line over a low pass in the Coast Range Mountains was completed but ample storage of water in the local reservoirs of the Water Department made it unnecessary, for the time being, to install the pumps and put the line into service. During the fiscal year 1931-32, 72 miles of large pipe line were constructed.

The Coast Range tunnel construction has been pushed with speed and economy. Since August 15, 1932, the work has been done by the Hetch Hetchy Department under contract at a substantial saving to the City.

This tunnel is 28.6 miles long. At present, June 30, 1933, more than 28 miles have been excavated (leaving one-half mile still to drive) and 22 miles have been lined with concrete and gunite. Equipment finally released from the work is being sold at public auction.

Contract has been let for the 1.4 miles of pipe to connect the Coast Range tunnel to the existing Bay Crossing pipe, and on July 7, 1933, bids will be received for construction of the Alameda Creek siphon connecting the two main units of the Coast Range tunnel and for the connection between the San Joaquin pipe line and the tunnel, thus completing the aqueduct.

A portion of the Cherry River aqueduct was reconstructed using steel pipe to replace wooden flume.

Due to scant precipitation in the mountains, the power production from Moccasin Power House in 1931-32 was below average.

Studies of the practicability of raising O'Shaughnessy Dam to its full, ultimate height of 430 feet are being made, preparatory to asking for funds for the work under the National Industrial Recovery Act.

Organization:

The new Charter of the City and County of San Francisco in effect January 8, 1932, transferred the Hetch Hetchy Water Supply work from the Board of Public Works to the Public Utilities Commission.

Until June 16, 1932, all construction and operation of the Hetch Hetchy Project were under Mr. M. M. O'Shaughnessy, City Engineer for 20 years. On that date the construction work was put under Mr. L. T. McAfee, formerly Chief Assistant Engineer, who was then appointed Chief Engineer and Manager, while the power operation was put in charge of Mr. P. J. Ost, formerly Chief Electrical Engineer, who became Manager and Chief Electrical Engineer of Power Operation. Mr. O'Shaughnessy continues as Consulting Engineer of the Public Utilities Commission.

This report chronicles the activities of both the construction and operative divisions for the entire fiscal year 1931-32 under the Board of Public Works and the Public Utilities Commission and of the construction division for the fiscal year 1932-33.

The engineering force in the San Francisco office designs all structures, prepares plans and specifications for all proposed work and for many proposals of the Purchaser of Supplies, makes all necessary engineering studies, prepares maps and descriptions of lands and rights of way, maintains records of all construction and operation, selects equipment, handles correspondence, does considerable publicity work, checks all requisitions for material, bills and payrolls, and directs operation of the power system. The department also does both civil and electrical engineering for the Airport Department.

Civil and mechanical engineering are under L. W. Stocker, Chief Civil Engineer. Electrical engineering is under P. J. Ost, Chief Electrical Engineer, whose duties include also all such work for the Municipal Railway and for the lighting of streets and public buildings. Testing of construction materials is done by C. L. Cook, Engineering Chemist, who also acts as concrete technologist or consultant on concrete construction. General office work, recommendations for contract payments, bills, payrolls and purchasing were handled by H. W. Kephart until January 8, 1932, when he and his assistants were transferred to the office of the Purchaser of Supplies. His assignments other than purchasing were assumed by L. B. Cheminant, Office Engineer. Hydrography is in charge of M. J. Bartell, Assistant Hydraulic Engineer. In the studies of pump characteristics and water hammer for the Corral Hollow pipe line, the City was assisted by Murrough P. O'Brien, Associate Professor of Mechanical Engineering, University of California.

Eugene Burjan, Engineering Draftsman, who entered the service on October 13, 1910, was retired on September 1, 1932.

Litigation:

In May, 1932, a company known as Meridian, Ltd., owner of El Solyo Ranch on the west side of the San Joaquin River, about five miles below the confluence of the Tuolumne River, filed suit against the City and County of San Francisco and the Turlock, Modesto, Waterford and West Stanislaus Irrigation Districts. The suit challenges the City's water rights on the Tuolumne River and seeks to quiet title to certain appropriative water rights, and with respect to riparian rights asks an injunction to prevent the City from diverting any water from the watershed of the Tuolumne River; in the event that the injunction is denied, the plaintiff asks for damages which it alleges will result from the City's diversion of the water.

The case is complicated by the fact that it involves water rights of the several defendants. Therefore the City must defend itself not only against the plaintiff, but also against the other defendants.

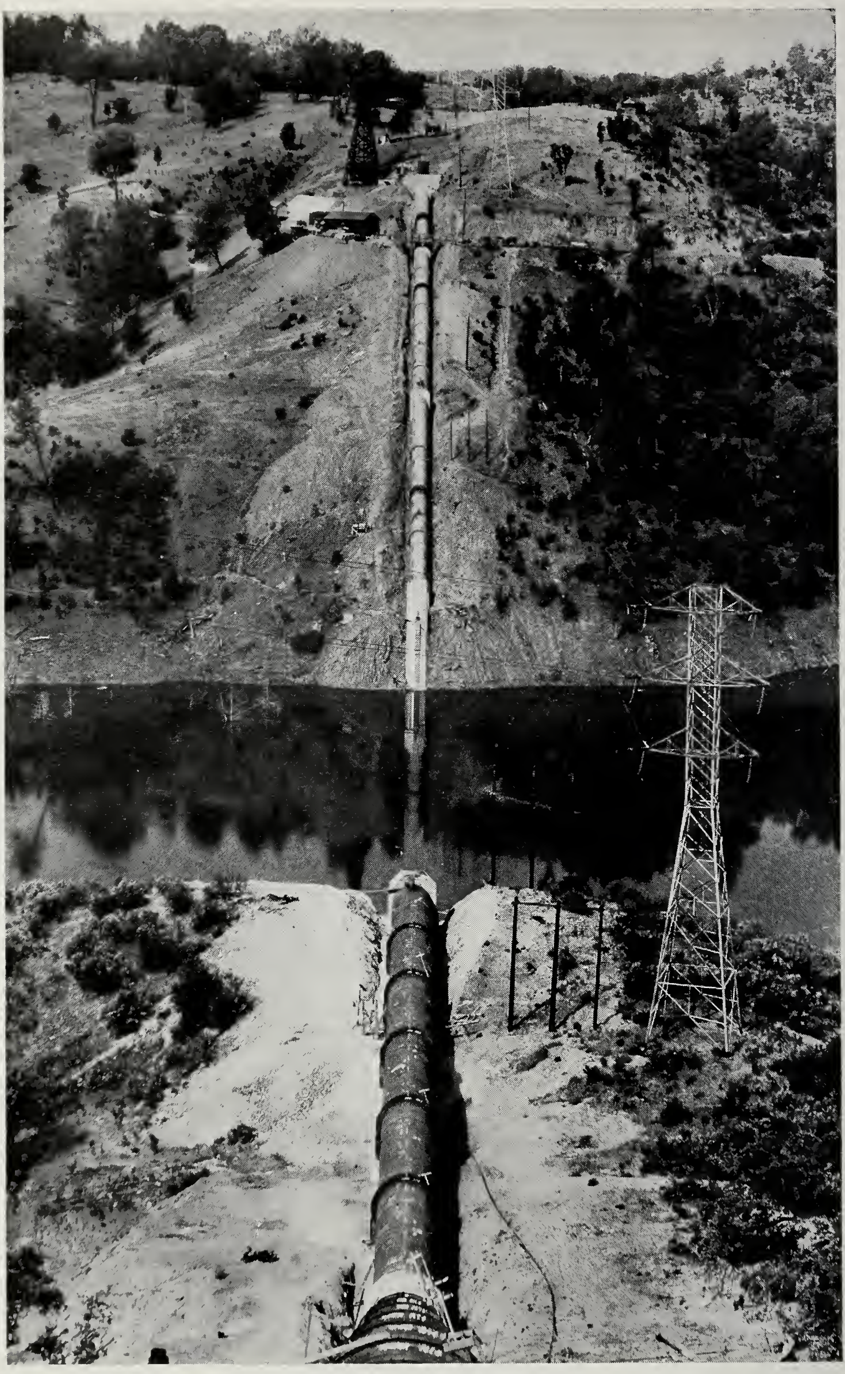
Other similar suits were subsequently filed by a number of plaintiffs.

The City's defense is directed by the Public Utilities Commission. Preparation of the hydrographic and other data necessary for presentation in court is being done by M. J. Bartell, Assistant Hydraulic Engineer, under the direction of M. M. O'Shaughnessy, Consulting Engineer, at the request of John J. O'Toole, City Attorney. On the City Attorney's staff are Dion Holm, Assistant City Attorney, E. A. Chandler, Special Attorney, and Consulting Engineers Thomas Means, B. A. Etcheverry and George A. Elliott.

Field Headquarters:

Construction operations on the Coast Range continue from Livermore headquarters under direct supervision of C. R. Rankin, Construction Engineer, assisted by John H. Ryan. Accounting work for the entire Hetch Hetchy system is carried on at the same office, under direct charge of Willis O'Brien, Chief Accountant and Auditor.

Construction of the San Joaquin pipe line was handled from a local headquarters office at Tracy and a branch office at Oakdale. This pipe line work and the Red Mountain Bar siphon were under direct charge of L. A. McAtee, Construction Engineer, and he now has charge of the construction of the Bay Crossing pipe line.



RED MOUNTAIN BAR SIPHON
Riveted pipe 9½ feet in diameter crossing canyon of Tuolumne River.

Construction of the Corral Hollow pipe line was under direct charge of M. J. Bartell, Construction Engineer, with headquarters at Livermore.

Operation of the Hetch Hetchy Power System is carried on from headquarters at Moccasin, under direct charge of Thornton Easler, Assistant Electrical Engineer. Construction of trails above Hetch Hetchy Reservoir, paving of the road from Mather to Hetch Hetchy, and reconstruction of a portion of the Lower Cherry River Aqueduct were directed from this office.

Field Employees:

With the maintenance of a large crew in the Coast Range tunnel and the construction of several large pipe lines under contract, the number of employees during the fiscal year 1931-32 was greater than for any year since 1923. The peak of employment was reached in October, 1931, with close to 2,000 employees. Following a decrease during the winter months, the number increased in the spring but declined rapidly near the close of the fiscal year so that the statement below does not reflect the condition for the entire year.

The following table shows the total number of employees including field headquarters and engineering forces, as of June 30, 1931, 1932 and 1933:

	6-30-31		6-30-32		6-30-33	
	Con.	Main. and Oper.	Con.	Main. and Oper.	Con.	Main. and Oper.
General, Miscl. on power system		46		33		55
Lake Eleanor		1		1		1
O'Shaughnessy Dam	16	2		2		2
Cherry Power System	16	8		8		8
Mountain Division Tunnel		2		1		1
Moccasin Division:						
Power House		25		25		25
Transmission Line		4		4		4
Foothill Division Tunnel		4	40	4		3
San Joaquin Division	18		45			
Coast Range Division:						
General	46		47		44	
Utilities	158		101		55	
Tunnel	1290		932		564	
Corral Hollow Pipe Line			105			1
Bay Crossing Division					15	
	1544	92	1270	78	678	100
TOTAL	1636		1348		778	

Medical Service:

The City continues to operate the Hetch Hetchy Hospital at Livermore. The hospital has capacity for 35 patients and handles both medical and industrial cases of employees. Its equipment is modern and complete.

Each applicant for employment on the construction work must pass a physical examination at the hospital. During employment he pays a fee of

$1 per month, which entitles him to free medical treatment, drugs, operation, etc., for any sickness contracted while employed, except such as might be the result of vicious or immoral conduct, or due to causes antedating his service with the City. All accident cases receive treatment here and, when necessary, are referred to specialists in San Francisco.

All construction employees are insured in the State Compensation Insurance Fund through an "ex-medico" contract under which the City undertakes all ordinary care of patients but may be called upon by the Fund to pay the cost of examination and treatment by specialists.

Ambulance service is provided, subject to immediate call both day and night. Hospital operations continue in charge of Dr. John P. Degnan.

The record of cases treated during the two years is as follows:

Clinical cases:	1931-32		1932-33	
City employees	2410		1578	
Outside pay patients	143		....	
Total non-hospital cases		2553		1578
Hospital cases:				
City employees	520		424	
Outside pay patients	155		132	
Total hospital cases		675		556
Major operations		84		92

BRIDGE OVER FALLS CREEK

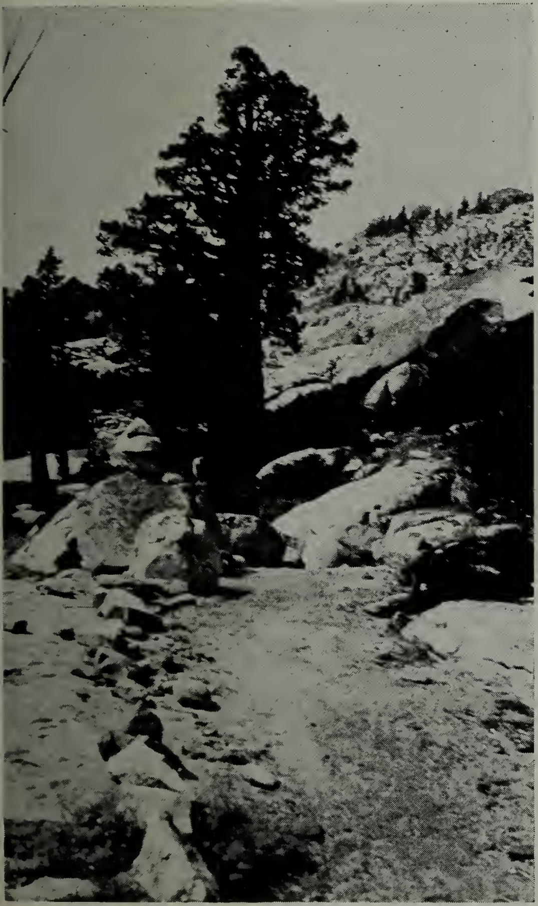
Relations with United States Department of the Interior:

As noted in the last Annual Report (Annual Report of the Bureau of Engineering of the Department of Public Works for the fiscal year ended June 30, 1931), at a conference held in Washington, D. C., in December, 1930, between representatives of the City and the Department of the Interior, a program was agreed upon which would satisfy the Department's requests for the City's fulfillment of the obligations of the Raker Act as to construction of roads and trails, and as to land conveyances.

Construction of Trails:

In accordance with this agreement, the City built 8½ miles of trail in 1930, as noted in the previous Annual Report. In the fall of 1931 the work was completed by construction of six miles of trail from Tiltill Valley to Lake Vernon, and 9½ miles from Rancheria Creek over Rancheria Mountain to a junction with the Bear Valley and Pleasant Valley trails. At Rancheria Creek a substantial cabin used by the trail crews was left to serve for storage of hand tools. It may also be used as a temporary shelter should anyone be caught unexpectedly in a storm.

The work was done by day labor employees under direction of the City Engineer. The trails, built under specifications of the Department of the Interior, were, on completion, inspected and approved by officials of the National Park Service. They are of a high type of construction, far superior to the trails with which they connect at their easterly termini. The standards of construction are similar to those followed in the highest grade of trail work in the vicinity of Yosemite Valley.



TYPICAL TRAIL

Mather-Hetch Hetchy Road:

To fulfill the terms of the agreement, the City improved the road from Mather to Hetch Hetchy by placing an asphaltic pavement 16 feet wide, with three-foot shoulders, and rubble masonry guard walls and curbing where necessary. The completion of this road, and of the trail work above noted, satisfies the Department's demands for actual physical construction by the City.

Payments to the United States:

A further clause of the agreement requires the City to pay to the National Park Service $250,000 annually for the five years 1932 to 1936 inclusive, for certain road work. This obligation is being met.

Hydrography and Meteorology:

Continuous measurement of flow of the Tuolumne River and important tributaries has been maintained since the early days of the work. Originally this was done by direct employees of the City, but, as the Raker Act requires determination of the amounts of water available for the use of Turlock and Modesto Irrigation Districts, arrangements were made whereby the United States Geological Survey, Water Resources Branch, conducts the hydrographic work, both field and office, and is reimbursed by the City. One hydrographer, with headquarters at Groveland, Tuolumne County, does all necessary field work.

Mateorological observations are carried on at Hetch Hetchy and Lake Eleanor as cooperative stations with the United States Weather Bureau. These data are secured by the City's lake tenders at those points and transmitted direct to the Bureau.

Publicity:

The constructed features of the Hetch Hetchy Project are of great extent and are situated generally at great distances from the City, O'Shaughnessy Dam being distant 200 miles by the commonly traveled highway. It is difficult for the average citizen to visualize the magnitude of the work, even if he be enterprising enough to undertake a tour of the aqueduct.

This department has adopted several means of enlightening the public on the various features of the work. At irregular intervals it has published booklets and pamphlets describing the work, and has distributed them gratis to applicants. In November, 1931, it issued a 64-page illustrated booklet covering the entire work from its inception to the date of issue. This volume briefly treats every phase of the project. Its distribution is limited to adults.

To give a briefer general view of the project, and for school children, a condensed description of the entire project is issued as an eight-page pamphlet. A large stock of these pamphlets is always on hand for distribution to all applicants and many copies are issued by the School Department of the City. This pamphlet is revised up to date and reprinted when necessary.

At O'Shaughnessy Dam, during the summer season, an employee is always in readiness to acquaint visitors with the general features of the work, to distribute publicity matter when requested, and to guide visitors over and through the dam.

At Moccasin Power House there is a visitors' gallery to which the public is invited to view operation of the plant.

Publicity matter of this department has been in charge of L. B. Cheminant, Office Engineer. The newly constituted Bureau of Public Relations under Jackson T. Carle, Director, has now assumed charge of all publicity of the Public Utilities Commission.

Inspection Trips:

The annual inspection trip of the Grand Jury over the Hetch Hetchy work made on September 3 to 5, 1932, brought forth the usual commendatory report. The annual trip of the Board of Supervisors was indefinitely postponed.

Among the many distinguished visitors who inspected the work is J. Waldo Smith, who for many years served as Chief Engineer and later as Consulting Engineer of the Board of Water Supply of New York. In a letter to Consulting Engineer O'Shaughnessy he states:

> "I wish to express to you my unqualified admiration for the conception and execution . . . of the aqueduct.
>
> "The driving of the 28½ miles of tunnels through the Coast Range is a sound engineering plan. It involves many difficulties which have been overcome in a manner that reflects the utmost credit on your engineering staff and the entire construction organization. . . .
>
> "When the project is completed, it will stand as one of San Francisco's greatest assets, and as a lasting monument to the energy of the City and its citizens, and their faith in the future."

The San Francisco Section of the American Society of Civil Engineers made two visits to the construction, one to the San Joaquin pipe and one to the Coast Range tunnel.

Emergency Construction to Avert Water Shortage:

The previous annual report, under this same caption (p. 75 et. seq.) described in detail the recurrence of dry seasons that led to the adoption of a program of construction that would quickly bring in a supply of Hetch Hetchy water to augment the diminishing supply from the local sources of the Water Department.

This program contemplated immediate completion of the Red Mountain Bar siphon in Tuolumne County, construction of the San Joaquin pipe line and of an emergency pipe line to by-pass the uncompleted portion of the

Coast Range tunnel, and construction of a short pipe line to connect this tunnel to the present Bay Crossing pipe line.

The Red Mountain Bar siphon and the San Joaquin pipe line have been completed and the Bay Crossing pipe line is under construction. The Corral Hollow (emergency) pipe was completed, but the rainfall for the season of 1931-32, although slightly below normal, provided such storage of water in the local reservoirs that it was deemed inadvisable to incur the further expense necessary to put the line into service. Therefore the pumping stations and power transmission lines to them were not built and the pump units and other equipment were placed in storage. If necessity should arise, the pumps could be installed and the line put into operation in about three months.

Corral Hollow Pipe Line:

The previous annual report notes that studies were then in progress to determine the more feasible of two possible locations for an emergency pipe line over the Coast Range Mountains. These studies resulted in selection of the Corral Hollow route as the more economical for operation for a somewhat limited period and its construction was authorized.

This route utilizes the completed section of tunnel, 4.4 miles in length, from Tesla Portal to Thomas Shaft. The pipe line plan includes the following features:—a pumping station in the tunnel, close to Thomas Shaft, at elevation 387 feet, to lift the water through 36-inch pipe in a specially constructed shaft to a second pumping station at the surface; a pipe line 44 inches in diameter and 6½ miles long to a third pumping station; pipe line 40 and 44 inches in diameter, three-fourths of a mile in length to Seco Summit, elevation 1633.5 feet; a 7x7-foot tunnel 700 feet long, through the summit, which reduces the pumping head 93 feet, as compared with piping over the summit; and 16¾ miles of 36-inch pipe to Alameda west portal of the Coast Range tunnel. The completed section of tunnel, 3.5 miles in length to Irvington portal would be used. Capacity of the pipe line is 45 million gallons daily.

CORRAL HOLLOW PIPE LINE
Typical view of 36-inch pipe line crossing one of the ravines tributary to Arroyo del Valle.

Bids for the construction of the Corral Hollow pipe line were received November 4, 1931 by the Board of Public Works and two days later a contract was awarded to Youdall Construction Company in the estimated amount of $951,050.90. Field construction work began December 14, 1931 and the pipe line was completed June 4, 1932.

The pipe was fabricated in 30 foot lengths, two of which were joined in the shop by an electrically welded girth seam. The 60-foot lengths were delivered to the job by truck, laid in the trench by a boom Caterpillar and the girth seams welded with current furnished by portable electric generators. Pipe of ¼-inch plate was field-tested to a maximum pressure of 308 pounds per square inch and a minimum of 168 pounds at certain summits.

The pipe is laid in a right of way easement 50 feet wide except in the vicinity of Thomas Shaft and Alameda West Portal where the land is owned in fee by the City. In general the pipe is covered with 1½ to 2 feet of earth.

Power System:

Two power houses are operated as part of the Hetch Hetchy system. The older and smaller of these is located at Early Intake and is called the Lower Cherry Power House or the Early Intake Power House. It uses water released from storage in Lake Eleanor, reinforced by the flow of Cherry River. The installed capacity is 3300 kva. The large plant, known as Moccasin Power House, is on the main aqueduct and uses water from Hetch

MOCCASIN POWER HOUSE

Hetchy and such Cherry and Lake Eleanor water as is not used in the small power house. Its installed capacity is 80,000 kva.

The operation of both power houses was seriously interferred with by the shortage of water in the early autumn and winter of 1931. The runoff from the Tuolumne River drainage area in the spring of 1931, though greater than for most Sierra streams, was approximately 44 per cent of normal. The water impounded in Hetch Hetchy reservoir amounted to 127,000 acre feet out of a possible 206,000 acre feet.

A portion of this storage belonged to the Turlock and Modesto Irrigation Districts as the City had not released to them the full stream flow to which they are entitled under the Raker Act. It was the intention to release this water to them gradually while generating the maximum amount of power by running Mocassin Power House to capacity. However, in July, August and September, the necessity for water for irrigation became very urgent and water was released to the irrigationists from storage faster than it could be handled through the power house. This rapid release caused the loss of some anticipated revenue although by holding stream flow the City had benefited to the extent of over $100,000 with no detriment to the irrigationists. However, due to the fact that this water was not stored in Don Pedro reservoir, the head on the Don Pedro Power House was reduced. The claim of the Turlock Irrigation District was honored by the City for $26,750 to cover actual power loss on this account. After having paid this amount the City still profited through utilization of this water for power generation.

The relations between the irrigation districts and the City have been very amicable and under similar circumstances there should be no difficulty in again temporarily securing the privilege of utilizing water belonging to the districts for power purposes, as long as they are guaranteed against loss.

The generous rainfall of the winter of 1931-32 resulted in a far more favorable condition than for the preceding year. The following table gives the comparison of the 1931-32 season with previous seasons both as to runoff and as to rainfall:

HETCH HETCHY RUNOFF

	Acre Feet	Per Cent of Average
Average 1910 to 1932	693,685	100
Maximum 1910-11	1,233,000	178
Minimum 1923-24	266,583	38
Present 1931-32	857,681	124

RAINFALL

	Hetch Hetchy		Lake Eleanor	
	Inches	%	Inches	%
Average 1910 to 1932	31.98	100	39.10	100
Season 1930-31	23.55	74	29.99	77
Season 1931-32	37.96	119	52.14	133

GENERATION AND DISTRIBUTION OF ELECTRICAL ENERGY

	1930-1931 kw-hrs.	1931-1932 kw-hrs.
Generated by Moccasin Power House	465,518,000	341,809,500
Generated by Early Intake Power House	8,706,800	13,206,800
Received from Pacific Gas & Electric Company	1,000	
TOTAL ENERGY	474,225,800	355,016,300
Consigned to Pacific Gas & Electric Company, Newark	400,136,000	289,452,000
Delivered to Pacific Gas & Electric Company, Tuolumne	6,380,000	9,687,000
Used at power houses	1,106,000	637,680
Used on Mountain Division	240,000	623,139
Used on Foothill Division	155,950	189,200
Used on Coast Range Division	28,919,900	33,434,000
Losses and unaccounted for	37,387,950	20,993,281
TOTAL ENERGY	474,225,800	355,016,300

The reservoir capacity and amount of water in storage on July 1, 1931, were as follows:

	Reservoir Capacity	In Storage
Lake Eleanor	28,000 acre feet	21,084 acre feet
Hetch Hetchy	206,000 acre feet	100,024 acre feet

By August 6, 1931, storage in Lake Eleanor had been drawn down to 1,000 acre feet and the Lower Cherry Power House was entirely shut down. The storage flume was changed to pipe as indicated under Contract No. 127 and the plant again started operation on January 14, 1932. Lake Eleanor filled quite rapidly and began spilling on February 26, 1932.

On September 7, 1931 when the storage in Hetch Hetchy reservoir had been drawn down to 7,944 acre feet, the draft was reduced to what could be produced by the natural flow of the Tuolumne River without drawing from storage. The power output at Moccasin power house was correspondingly diminished. The water remaining in storage was held as an emergency supply for the construction work on the Coast Range and as a standby for the Pacific Gas and Electric Company. On February 1, 1932, runoff had increased to permit the resumption of full load and on May 27 Hetch Hetchy reservoir began spilling. On July 1 both Lake Eleanor and O'Shaughnessy dam were continuing to spill.

The shortage of water permitted the doing of maintenance and inspection work on the generating units at Moccasin power house which under normal circumstances could not be undertaken. Each water wheel and generator was gone over very carefully, the generators were thoroughly cleaned of the dust and dirt which had collected during the six years of operation, and all windings were inspected, tightened in place and painted. Adjustments and inspections of a minor nature were made on all other equipment not normally accessible when in operation.

The installation of vibration dampers on the transmission line between Moccasin and Newark substation was completed.

On March 21, 1932, Charles G. Dorman, Chief Operator at Lower Cherry power house, suffered a heart attack while in his garden, from which he died almost immediately. Mr. Dorman had been connected with this plant since September 9, 1922. He was a most faithful, dependable and lovable employee and his passing is noted with regret by everyone in the organization.

Hetch Hetchy Railroad:

The Hetch Hetchy railroad, which was constructed in 1916, is the only available means of transportation during the winter months. A number of bridges and trestles that have shown marked deterioration from age have been repaired and put in good condition, using concrete footings where economical to do so, and tie replacements were commenced by changing every fourth or fifth tie. By carrying out this program of tie replacement it will be possible to continue the operation of gasoline motor equipment over the road without in any year expending a great deal of money for replacements. This type of maintenance will not however, be sufficient to permit using steam locomotives, although it will keep the roadbed in condition so that with the minimum of expense it can be brought up to steam road maintenance should heavy construction work on the upper end of the system be necessary.

Lower Cherry River Aqueduct, Replacement of Flume:

The aqueduct supplying water from Cherry River to Lower Cherry Power House included some wooden flume with yellow pine box on cedar mud-sills, most of which was constructed in 1917. The portions of flume adjacent to the power house, particularly 2,205 feet of 9x10, 2,065 feet of 4x3, and 20 feet of 14x19, had deteriorated to such an extent that their replacement was necessary. It was decided to let a contract for furnishing and installing steel pipe instead of wooden flume, the City to do all grading and miscellaneous work and to transport the pipe.

The old flume had been designed as a forebay for operating the power house on the construction load and had considerably larger capacity than was necessary merely to carry the water. After the flume had been built, the connection of the power house to the Pacific Gas and Electric Company lines gave the plant a uniform load and practically eliminated the necessity for a large forebay. The contract for pipe therefore was made to include 1,000 feet of 75-inch and 1,350 feet of 60-inch pipe in the aqueduct proper, and 2,000 feet of 36-inch pipe to divert water from this aqueduct to the main Hetch Hetchy aqueduct at Early Intake diversion dam and make Lake Eleanor and Cherry River water available for operation of Moccasin power house.

Bids for this contract (No. 127) were received on August 28, 1931, and contract was awarded September 2 to Steel Tank and Pipe Company of California in the estimated amount of $42,287. One other bid of $55,609 was submitted. The contract specified pipe with welded longitudinal joints. The field joints also were welded.

The pipe was fabricated in Berkeley and shipped by rail to Hetch Hetchy Junction. It was then hauled to Intake Siding over the Hetch Hetchy railroad in two-car trains by a twenty-ton gasoline locomotive. The haul was 51 miles and a round trip required 16 hours. The pipe was transferred by crane from flat cars to cars on an incline tramway which in a length of 3,600 feet, descends 1,600 feet to the bank of the Tuolumne River. Here the pipe was picked up by aerial cableway and taken to the pipe bench where a 2-foot gauge railroad was used to carry it to the trench.

The 75-inch pipe extends along the old flume bench from the last concrete lined tunnel to the power house penstock. The 60-inch pipe continues along the bench and from its termination the 36-inch pipe descends on a new grade to discharge into the Tuolumne River at the diversion dam. After the 75-inch pipe had been laid and tested, a concrete forebay was built and the backfill of the pipe trench was completed by mucking down material from the hillside. After many interruptions by storms the work was completed and put in service late in December 1931.

Canyon Division, Mather-Hetch Hetchy Road:

As noted under "Relations with United States Department of the Interior," the City reconstructed the road from Mather to Hetch Hetchy.

In 1914 the City constructed 9.1 miles of 22-foot roadbed with a maximum grade of 4 per cent from Hog Ranch, now called Mather, to Hetch Hetchy damsite. During the construction of the dam, this was used as a railroad grade but after the completion of the dam, was converted into an excellent mountain roadway by the removal of the rails and ties and the spreading of the disintegrated granite ballast. The Department of the Interior required that this road be further improved by modern paving.

Plans and specifications for this work were made to conform to the standards required by the Department of the Interior and were approved by the National Park Service. Bids were received by the Board of Public Works on July 8, 1931, and contract awarded July 10 to A. G. Raisch in the estimated amount of $125,714. The only other bid received was for $171,391.50.

This contract covered the necessary smoothing of the subgrade and the laying of a rock base with asphaltic surface, together with the construction of granite masonry guard walls and curbing at all points where the ground surface dangerously drops away from the side of the road.

The contractor commenced work shortly after the award, using as far as possible sub-contractors on everything but the actual work of grading the road. Various difficulties were encountered and the work was still under way when the winter set in. The work shut down early in December 1931, opened up in April 1932, and was completed in August 1932. The road as completed has a smooth, asphalt pavement, 16 feet in width, with 3 foot shoulders, with super-elevation on curves and is far superior to any roads within the immediate neighborhood.

Aqueduct, Mountain Division:

This division extends to Priest reservoir and consists of the Early Intake diversion dam and headworks, 18.8 miles of tunnel and 225½ feet of 9½-feet diameter steel pipe. It is used and maintained by the Power Operative Department.

The first half mile of tunnel from the diversion dam is 13 feet 4 inches wide and 14 feet 3 inches high, with arched top and is not lined with concrete except for scattering short lengths. The next 7 miles, except the pipe crossing at South Fork of Tuolumne River, is also in solid granite and is unlined. This section is 13 feet 4 inches wide and 13 feet 6 inches high. The remaining portion, 11½ miles, is lined to a horse-shoe shape 10¼ feet in diameter.

On January 22, 23 and 24, 1932, the tunnel was unwatered and inspected. The concrete lining showed very little effect of erosion. A few small spalls of granite had dropped from the roof in the unlined section, and there were occasional deposits of sand and gravel which had been washed from the tunnel bottom where concrete invert had not been placed. Repairs were made to some minor inperfections in the concrete invert. The material for this work was hauled into the tunnel in rubber tired carts drawn by mules.

At Second Garrote shaft a deep well pump is used to draw water from the tunnel for fire protection and other uses in the City's buildings at Groveland. This pump requires occasional maintenance work.

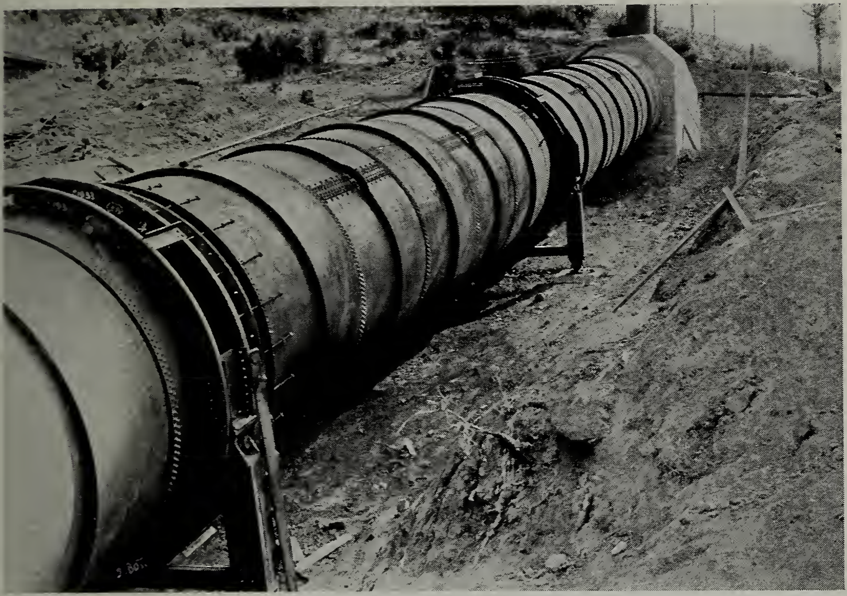
Aqueduct, Foothill Division:

This division is 16.3 miles in length from the tailrace of Moccasin power house to the edge of the San Joaquin valley. It comprises Moccasin re-regulating reservoir, the Foothill tunnels, and Red Mountain Bar siphon.

Red Mountain Bar Siphon:

The only new construction in this division during the two year period was the completion of the Red Mountain Bar siphon. In 1922 and 1923, prior to completion of Don Pedro dam of the Turlock and Modesto Irrigation districts, the portion of the siphon below high water line of Don Pedro reservoir had been completed. This portion consists of 777 feet of 9½-feet diameter steel pipe with plate thickness ranging from 9/16 to ¾ inch.

During the fiscal year 1930-31 as part of the program for emergency water supply it was determined to complete the siphon immediately by extending the pipe 918 feet on the east side and 826 feet on the west, with sand trap, overflow structure and other appurtenances. Bids were received October 23, 1931 by the Board of Public Works and contract was awarded October 28 to MacDonald and Kahn Company, Ltd., in the estimated amount of $177,369 inclusive of bonus. Five bids were received, the highest of which was $213,708.50. The work was carried on with no untoward incident and completed May 28, 1932. The siphon consists of 9½-feet diameter steel pipe of thicknesses ranging from ⅜ inch to ¾ inch. The lighter pipe has double-riveted lap longitudinal joints. In the heaviest portion the pipe has triple-riveted



RED MOUNTAIN BAR SIPHON
Easterly portion and standpipe, showing detail of 9½-foot diameter pipe, expansion joint, stiffener rings and pipe support.

double butt-strap longitudinal joints. Steel angle stiffener and anchor rings were used. All pipe is supported on structural steel bents on concrete piers, except at angle points, where it is imbedded in concrete anchors. Suitable expansion joints are used. The trench was excavated but not back-filled. The exposed pipe is finished with aluminum paint to minimize expansion and contraction due to temperature changes.

At the tunnel portal on the east side a sand trap 28 feet long with blow-off was built. Immediately west of this is an open standpipe rising 86 feet above the center of the pipe.

Lower down on the east side is a taper section 34 feet long in which the pipe throttles down to 5 feet diameter. The reducing taper is to remain in the pipe. The other taper may be replaced by a cylindrical section to complete a venturi meter and also a regulating valve. These latter fittings will be necessary if and when the proposed Red Mountain Bar power house is built. The total length of 9½-feet diameter pipe laid under the present contract is 1618.5 feet.

Immediately next the west portal of tunnel is a concrete control structure with a 5-foot slide gate manually operated, to regulate the flow into the tunnel, and an 18-foot automatically operated radial gate on a spillway.

The contract included also a timber trestle to carry the Hetch Hetchy railroad over the pipe.

As in the work on Lower Cherry aqueduct, it was necessary to transport the pipe across the Tuolumne River. The 5-ton capacity aerial cableway built for handling material during construction of the tunnels was here used to good advantage. The Contractor was allowed the use of the City's camp at Pedro and was furnished with water and electric power from the City's lines. The camp buildings have since been removed.

Foothill Tunnels:

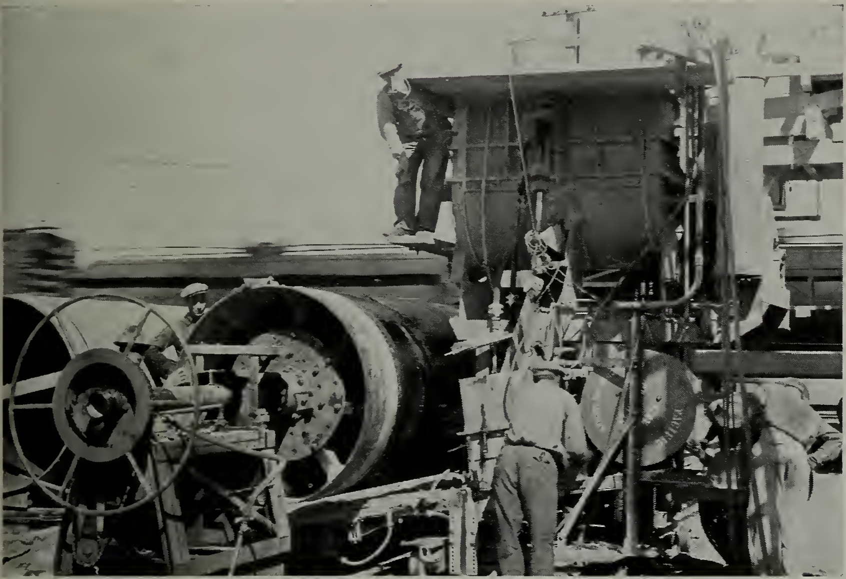
After completion of the pipe at Red Mountain Bar, the 10.6 mile portion of the tunnel from it to Oakdale portal was flushed out. Earlier in the year the 5.2 mile unit from Moccasin to Red Mountain Bar had been cleaned by diverting water through it and discharging the water back into the river.

Aqueduct, San Joaquin Division:

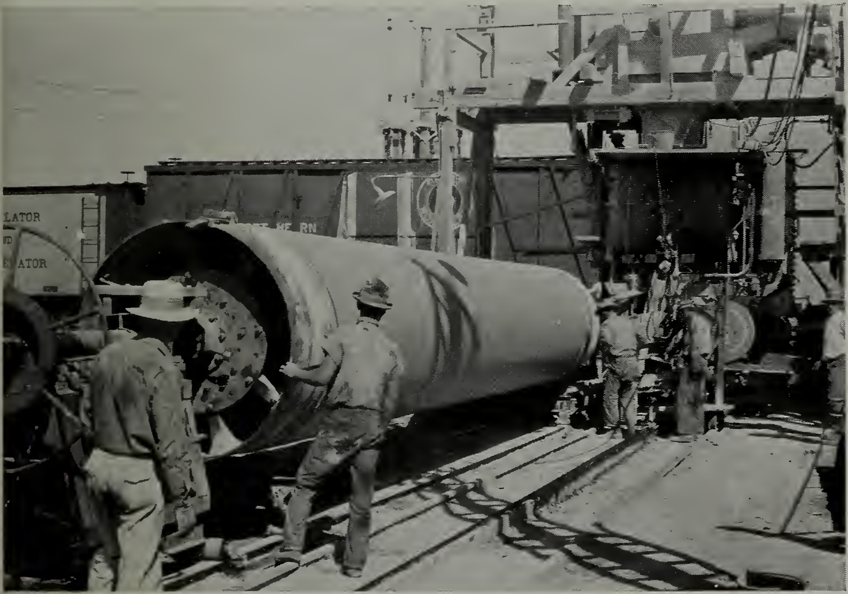
The San Joaquin division extends from Oakdale portal, the terminus of the Foothill tunnel, in Tuolumne County, at elevation 747 feet, to Tesla portal, the beginning of the Coast Range tunnel, in San Joaquin County, at elevation 399 feet. The entire division, 47.5 miles in length, consists of pipe line of 60 million gallons daily capacity. This pipe was laid during the fiscal year 1931-32. The completion of this work and of the Red Mountain Bar siphon, above described, brings the Hetch Hetchy water to the beginning of the Coast Range tunnel, 97 miles from O'Shaughnessy dam.

From Oakdale portal westerly for nearly ten miles the San Joaquin pipe line is laid in a strip of land 200 feet in width, owned in fee by the City. The right of way from this point across the valley, also owned in fee, is 110 feet wide and accommodates both the pipe and the Hetch Hetchy power transmission line. San Joaquin River and Elliott Cut, both classed as navigable streams, are crossed under authority of permits from the United States War Department and the Reclamation Board of the State of California. At a point 3 miles easterly from Tesla portal the pipe line and transmission line diverge. The pipe is here laid in a strip 150 feet wide, also owned in fee.

SAN JOAQUIN PIPE LINE, LAYING PIPE
Pipe shown is 62 inches in diameter, with metal 5/16 inch thick.



Machine placing special wrapping of cement mortar ½ inch thick.



Pipe with wrapping completed and ready for curing.

SAN JOAQUIN PIPE LINE, CEMENT-WRAPPED PIPE

Contract for construction of the pipe line was awarded May 22, 1931 by the Board of Public Works to Youdall Construction Company in the estimated amount of $4,136,479. The pipe line consists of 47½ miles of welded steel pipe from 56 to 66 inches in diameter, with plate thickness ranging from 5/16 to ½ inch.

The work was of more than common interest to engineers for several reasons. The contract price was far lower than usual. The Contractor made remarkable speed at low cost by use of an improved trenching machine which excavated the entire trench in the sandy loam across the valley. The use of a concrete envelope around the pipe as a protection against corrosive soil waters resulted in development of a highly satisfactory machine for spiral wrapping of the mortar around the pipe. This machine was perfected by W. A. Kraner of the Cement Wrapped Pipe Company, a sub-contractor. The submerged crossings of the navigable streams called for methods of construction out of the ordinary. In the low areas of the valley the trench was unwatered by pumping from wells spaced at approximately equal intervals in a line parallel to the trench.

The pipe was fabricated in the shops of the Western Pipe and Steel Company at South San Francisco and shipped thence by rail to the job. All shop seams were electrically welded. About 26 miles of pipe received the concrete mortar wrapping. This pipe was shipped by rail to the wrapping plant, which was situated first at Vernalis, and later at Modesto, and thence by truck to the trench. The sections of pipe were joined in the trench by riveted girth seams, except for a few miles near the east end, where pipe of lighter thicknesses has welded girth seams. After testing the pipe the concrete mortar wrapping was applied at the joints by the use of portable forms.

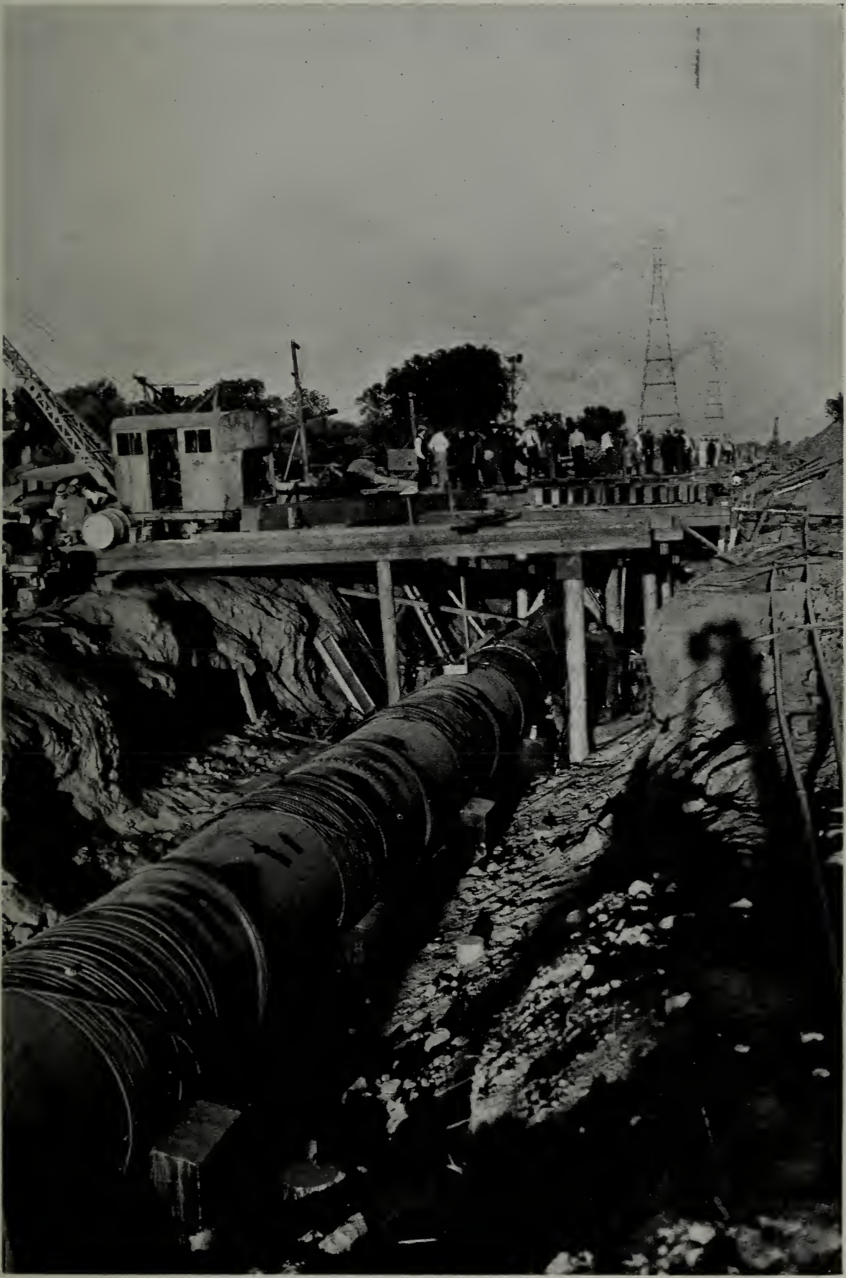
Tesla Portal Connection:

A gap of approximately 700 feet was left between the end of the San Joaquin pipe and Tesla portal of the Coast Range. Bids for construction of this connection and of the Alameda Creek siphon in one contract will be received by the Public Utilities Commission on July 7, 1933, with the expectation of completing the work by December.

The San Joaquin pipe is here 66 inches diameter. The contract calls for a 66x72-inch steel taper connection, 565 feet of 72-inch diameter steel pipe to a 10½-foot diameter steel manifold, and 105 feet of 10½-foot diameter steel pipe connecting to the tunnel portal. The 10½-foot pipe is to be covered with concrete and lined with cement mortar, while the 72-inch pipe is to be covered with cement mortar but not lined.

Aqueduct, Coast Range Division:

This division of the aqueduct extends in a southwesterly direction from Tesla portal, the end of the San Joaquin pipe line, in San Joaquin County, at elevation 399 feet, to Irvington portal in Alameda County, the beginning of the Bay Crossing pipe line, at elevation 316 feet. It consists of two tunnels 25.1 and 3.5 miles long, separated by a pipe which is 0.6 mile in length.



SAN JOAQUIN PIPE LINE AT RIVER CROSSING
The pipe is descending to pass under San Joaquin River. It lies on concrete saddles on wood pile bents and is ready to receive a 6-inch envelope of concrete.

The tunnels east of the San Joaquin valley were designed with sufficient area and fall to give a delivery in excess of 400 million gallons daily. In the Coast Range the water delivery conditions limit the fall, so that an area greater than that of these tunnels would be necessary to assure a similar quantity through the Coast Range Tunnel. Careful studies indicated a marked economy in driving this tunnel now to the same area as the tunnels east of the valley, giving a capacity of 250 million gallons daily. At some indefinite future date a second and parallel tunnel may be built. The present tunnel is 10 feet 6 inches diameter and has a grade of slightly less than 3 feet per mile.

The 25.1 mile tunnel from Tesla portal to Alameda Creek was driven from the two portals and from headings from five intermediate shafts. The Alameda-Irvington tunnel was driven from its two portals. As of July 1, 1933, 28.1 miles of tunnel have been driven, ½ mile remains to be driven. About 16 miles of concrete lining and 6 miles of gunite lining have been placed.

The valley of Alameda Creek will be crossed by 3,000 feet of 72-inch diameter steel pipe. As already noted, bids for construction of this pipe and of the 700 feet connection to the San Joaquin pipe line at Tesla portal, will be received on July 7, 1933.

Livermore Headquarters, Shops and Yards:

All work in the Coast Range division is handled from an office in Livermore; adjacent to this office are warehouses, shops and yards. These are served by two railroads and are central to the greater part of the tunnel work. This location does much to facilitate the work by rapid and efficient handling of materials and of maintenance work on equipment.

A yard at Sunol was used as a base for materials and supplies for the three westerly camps, Indian Creek, Alameda Creek and Irvington. This yard was also served by two railroads, and from it the roads to the camps are good and the haul is fairly short. Due to the practical completion of the work from these three camps, this yard has been discontinued.

Surveys:

The usual precise surveys of alignment and levels have been carried on throughout the year. The main survey party makes periodical checks of the surveys for line and grade made daily by the resident instrumentmen at the various camps. In swelling ground these check surveys are very necessary as the monuments often become displaced.

The projecting of surface surveys down shafts and through crosscuts and tunnels requires the utmost care and skill. That this work has been well done in the Coast Range Tunnel work is shown in the following table of closures:

Working Point:	Date Holed Through	Distance Miles	Error in Alignment Feet	Error in Grade Feet	Error in Length Feet
Tesla Portal	3-4-31	4.4	1.79	0.015	0.80
Thomas Shaft	6-7-33	4.3	0.5	0.273	0.78
Mitchell Shaft		5.3			
Mocho Shaft	5-12-32	2.9	0.685	0.044	1.80
Valle Shaft	1-14-33	5.1	0.66	0.038	3.72
Indian Creek Shaft	7-29-32	3.2	0.005	0.046	0.30
Alameda E. Portal					
Alameda W. Portal	8-11-31	3.4	0.20	0.080	0.54
Irvington Portal					

Water Supply:

Measurements of all springs and wells adjacent to the tunnel line have been continued throughout the year. In some cases these observations have been taken on springs or wells distant two miles from the aqueduct line. To obtain additional evidence of the amount of diminution in flow a special survey was made of springs and wells along the foothills from Mission San Jose to Alum Rock Park. The effect of the succession of dry winters is still evident in the decreased flow of all such water supplies.

The City has been assisted by William A. Simkins, consulting geologist, who on December 21, 1932, presented an exhaustive report on all springs and wells in the vicinity of the tunnel.

Gravel Plants:

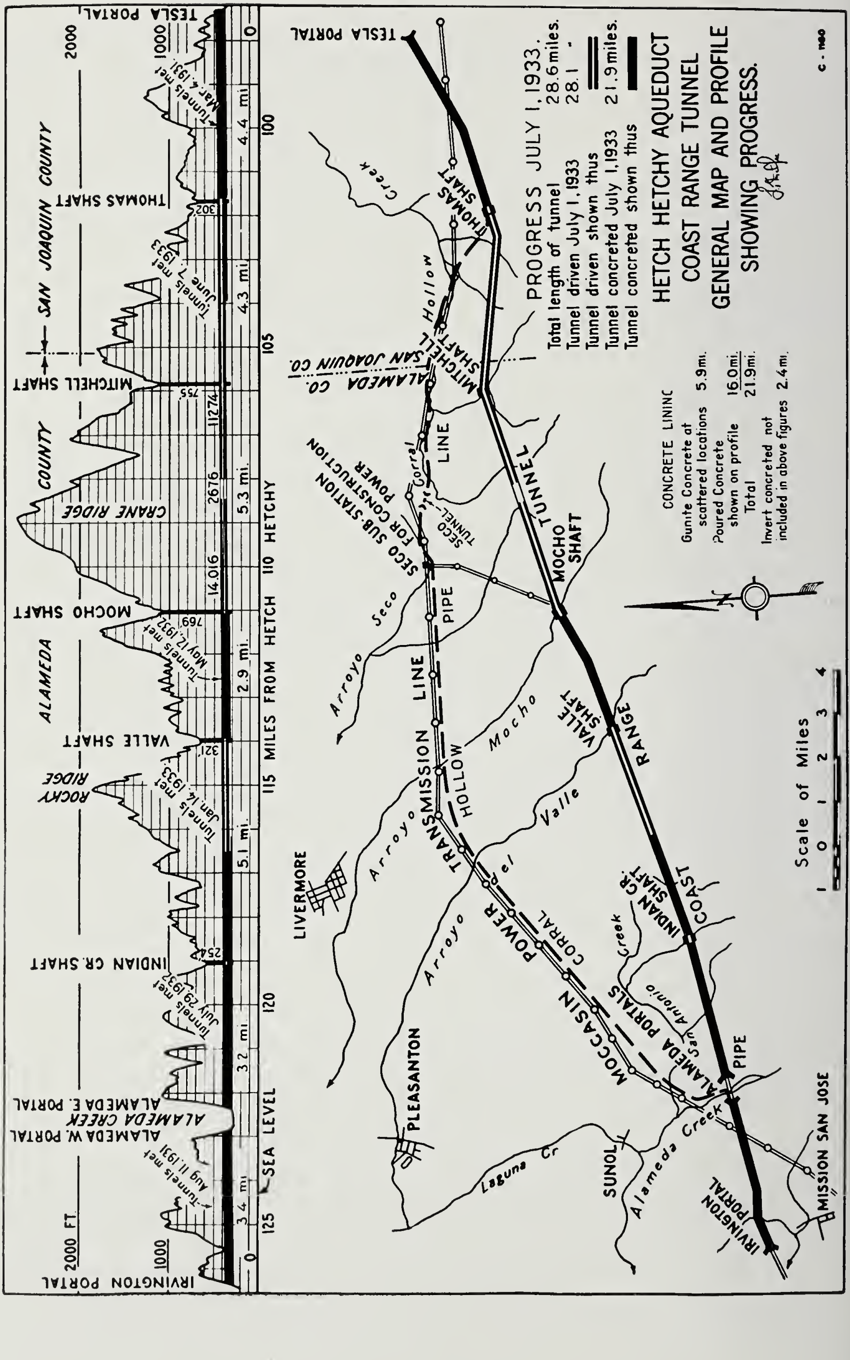
The small sand and gravel plant was moved from Corral Hollow and erected near Valle Camp. This plant was used for the production of sand for use only in gunite lining of the tunnels.

A large portable gravel plant with a rated capacity of 100 tons per hour was used in producing aggregate for tunnel lining and other concrete. Originally it was operated at Alameda portals and subsequently at Corral Hollow Creek near Thomas shaft. After storing 93,361 cubic yards of sand, 67,473 cubic yards of ¾-inch gravel and 109,615 cubic yards of 1½-inch gravel at Corral Hollow it was moved to Valle Camp. At this latter location it produced 96,756 cubic yards of sand, 80,802 cubic yards of ¾-inch gravel, and 104,641 cubic yards of 1½-inch gravel. The plant was shut down on August 15, 1932, as sufficient rock and sand had been put in storage.

Miscellaneous Utilities:

No new roads were built during the period but the usual amount of road maintenance was done.

A power line extension one-half mile in length was made from Valle Camp to serve the portable gravel plant. All power and telephone lines were maintained in the usual careful manner.


HETCH HETCHY AQUEDUCT
COAST RANGE TUNNEL
GENERAL MAP AND PROFILE
SHOWING PROGRESS.
PROGRESS JULY 1, 1933.
Total length of tunnel 28.6 miles.
Tunnel driven July 1, 1933 28.1 "
Tunnel driven shown thus
Tunnel concreted July 1, 1933 21.9 miles.
Tunnel concreted shown thus
CONCRETE LINING
Gunite Concrete at scattered locations 5.9 mi.
Poured Concrete shown on profile 16.0 mi.
Total 21.9 mi.
Invert concreted not included in above figures 2.4 mi.
Scale of Miles
1 0 1 2 3 4
TESLA PORTAL
THOMAS SHAFT
MITCHELL SHAFT
MOCHO SHAFT
VALLE SHAFT
INDIAN CR. SHAFT
ALAMEDA E. PORTAL
ALAMEDA W. PORTAL
ALAMEDA CREEK
IRVINGTON PORTAL
SAN JOAQUIN COUNTY
ALAMEDA COUNTY
CRANE RIDGE
ROCKY RIDGE
Tunnels met Mar. 4, 1931
Tunnels met June 7, 1933
Tunnels met May 12, 1932
Tunnels met Jan. 14, 1933
Tunnels met July 29, 1932
Tunnels met Aug 11, 1931
302'
755'
1127'
2676'
14,016'
769'
321'
254'
4.4 mi.
4.3 mi.
5.3 mi.
2.9 mi.
5.1 mi.
3.2 mi.
3.4 mi.
2000 FT.
1000
0
SEA LEVEL
100
105
110
115
120
125
MILES FROM HETCH HETCHY
SAN JOAQUIN CO.
ALAMEDA CO.
COAST RANGE TUNNEL
SECO SUB-STATION FOR CONSTRUCTION POWER
SECO TUNNEL
CORRAL HOLLOW PIPE LINE
TRANSMISSION LINE
POWER
MOCCASIN ALAMEDA PORTALS
PIPE
Hollow
Creek
Arroyo Seco
Arroyo Mocho
Arroyo Valle
Arroyo del Valle
Corral
Creek
San Antonio
Alameda Creek
Laguna Cr
LIVERMORE
PLEASANTON
SUNOL
MISSION SAN JOSE
c-1180

Geology:

The geology of this portion of the Coast Range Mountains is very intricate and has been the cause of much discussion. The first study in connection with the tunnel work was a reconnoissance made in 1912 by Dr. J. C. Branner, vice-president of Stanford University. This report is hardly more than a list of the formations which would be encountered in the tunnel, with some remarks on the earthquake hazard. A more extensive geological survey was made in 1916 by Mr. H. J. Packard and diamond drill borings were carried on to supplement his surface studies.

As a result of these studies the tunnel line was shifted well to the south of the originally projected location so as to traverse large areas of the Franciscan series and avoid the more difficult Cretaceous series. The rocks of the Franciscan series as encountered on the San Francisco peninsula have been tunneled without any outstanding difficulty, but in the Coast Range they have shown many characteristics that have tried to the utmost the capabilities of the engineers on the tunnel construction.

During 1930 and 1931, Dr. Bailey Willis of Stanford University, was engaged as consulting geologist and made detailed studies both on the surface and underground, resulting in valuable recommendations concerning the tunnel driving operations. Dr. Willis was assisted by M. J. Bartell, assistant hydraulic engineer of this department.

Dr. Willis states that the reasons for the unfavorable nature of Franciscan rocks in the Coast Range are the abundance of rocks of volcanic origin appearing as grains in the sandstones and the effect of alteration by steaming waters which at some time have permeated these rocks and caused recrystallization as chlorites and other objectionable minerals. Both of these factors have been a fundamental cause of swelling, squeezing, and excessive pressure. The red chert occurs in thin layers which are easily bent and broken to form red mud.

The Cretaceous shale often is broken up and carries large boulders (concretions) in clay, making the ground difficult to hold.

The Tertiary formations are younger than the Cretaceous, are less consolidated and have suffered more dislocation than is usual. The Santa Margarita sandstone varies from a hard, ringing rock to an incoherent sand. Lack of lime to form a cementing material for the sand grains left a body of such incoherent sand which, when pierced by the tunnel between Alameda and Indian Creek, resulted in a heavy flow of sand and water into the tunnel. At the base of the San Pablo formation is a bed of clay carrying gypsum which was difficult to mine as it was faulted and charged with water. The Tulare beds of river-laid sediments, fronting the San Joaquin valley, were pierced from Tesla portal with little difficulty for about 8000 feet.

The driving of the tunnel has been materially slowed down by encountering swelling ground. Two theories have been advanced to explain this swelling, first, that it is due to chemical changes in the rock upon being exposed to air, and second, that it is of a mechanical nature and is caused by entrance of water between the minute laminations of the rocks. Such swelling is stopped by the placing of gunite lining and Dr. Willis states:—"Observation of the condition of such linings after a year or more shows that the desired effect has been successfully accomplished."

The following quotation is of interest, coming from a letter written by the State official in charge of safety methods:

> "It would be impossible to describe in a few words the exceptionally bad ground which has been encountered. In some cases the ground has been so heavy that it could not possibly be held by timbering for more than forty-eight hours when it would have to be re-timbered. Guniting has been used a great deal, and in some cases inrushes of water and sand, or the squeezing of the very heavy ground have prevented any progress for a month at a time, with the entire force in such headings being devoted to recovering ground already opened up.
>
> . . . "I have endeavored to give you just a slight understanding of the difficulties that have been encountered as there have been so much injustice and unfair criticism of the progress which has been made in these tunnels. . . . I trust that some day there may be a complete report of this project made and credit given to the men who have worked so hard and under such unusual and difficult conditions with their only reward to date of unjustified, adverse criticism."
>
> (Signed) C. H. Fry,
> Superintendent of Safety
> Industrial Accident Commission
> State of California."

Safety Work—Mine Rescue and First Aid:

The entire work on the Coast Range division is supervised as to safety regulations by the United States Bureau of Mines and the Industrial Accident Commission of the State of California. Collaborating with them is an Assistant Engineer employed by the Hetch Hetchy Water Supply. Safety orders are issued from time to time by the Commission as the work progresses and their observance is rigidly enforced by the City's engineers. During the past year the only changes made in safety rules and equipment have been of a minor character.

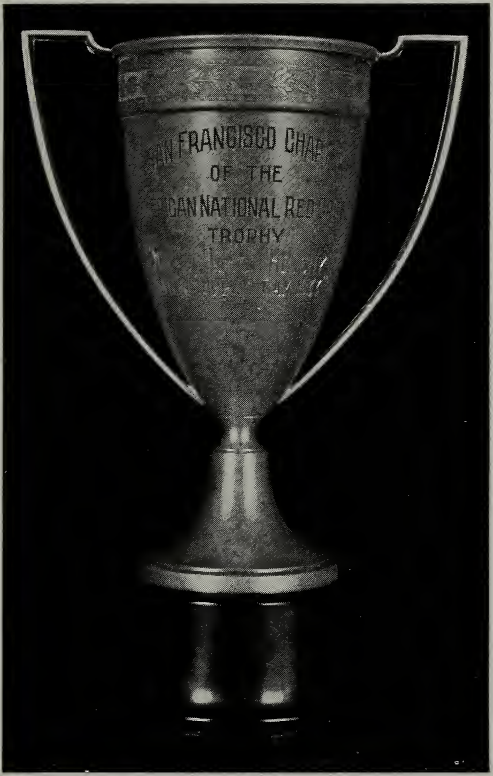
Training in mine rescue and first aid has been carried on continuously during the year. Additional training in mine rescue work was given to 542 men. The orders of the Industrial Accident Commission require that these trained men be given additional training at least once every month and that at six months' intervals they undergo a thorough physical examination. These examinations are conducted at the Hetch Hetchy hospital and the reports are transmitted to the United States Bureau of Mines.

Men and equipment for mine rescue are always available and subject to call by the Industrial Accident Commission or the Bureau of Mines in case of serious accident.

During the fiscal year 1931-32, first aid training was given to 788 new men. This training requires two hours per day for five days and is done on the men's own time. At the end of the course the men are examined by a representative of the United States Burau of Mines, and if found to be properly qualified, are presented with a certificate of training from the Bureau in addition to the one issued by the Hetch Hetchy Water Supply.

Interest in training is stimulated by contests between first aid teams from the different camps which are held at frequent intervals. These serve also as tryouts to select teams to compete in the State First Aid Meets. In the annual meet held at Fresno on May 21, 1932, the team from Mocho camp won first place in the Mining Division, with custody of the perpetual trophy formerly held by the team from the Engles Copper Mining Company, and also won a permanent cup for winning third place in the meet, having made the third highest score. At the meeting held in San Francisco on May 23, 1933, the team from Mocho camp won first place for the entire meet. The showing is all the more creditable in view of the fact that our men were competing with teams who have had years of experience and training.

First aid treatment administered by the trained men has undoubtedly saved life in a number of cases of severe injury to employees.



TROPHY WON BY FIRST AID TEAM FROM MOCHO CAMP

Observance of safety rules is stimulated by the custom that every week each camp which has not had an industrial accident case enter the hospital during the week is rewarded by a chicken dinner.

Tunnel Construction Contract:

From the beginning of work on the Coast Range tunnel the driving and lining operations were carried on by experienced day labor crews of the Hetch Hetchy department. The new Charter transferred this department from the Board of Public Works to the Public Utilities Commission.

The Charter provides (Sec. 95) that

> "The construction, . . . reconstruction or repair of public buildings, streets, utilities or other public works or improvements, and the purchasing of supplies, materials and equipment, when the expenditures involved in each case shall exceed the sum of one thousand dollars ($1,000), shall be done by contract, . . ."

During the preparation of specifications for the tunnel work, the construction was continued by the day labor crews, under authority of resolutions of the Board of Supervisors in accordance with Charter provisions, which declared that an emergency existed and that the work should be executed in the most expeditious manner.

The Charter provides that

> "The Board of Supervisors, by ordinance, shall establish procedure whereby appropriate City and County departments may file sealed bids for the execution of any work to be performed under contract. If such bid is the lowest, the contract shall be awarded to the department."

In accordance with this provision, the Hetch Hetchy Department prepared a bid on the tunnel construction.

On June 6, 1932, the Public Utilities Commission opened bids for the construction of the Coast Range tunnel under Contract 135. The form of proposal was so drawn as to permit bidding on all of the work described in the specifications or on any one or any two of the three sections into which the work was divided. Proposition ABC covers the entire work of the three sections, propositions A, B and C cover sections A, B and C respectively taken separately, and propositions AB, AC and BC cover combinations of two sections each.

Five bids were received as follows:

1. Bechtel Bros., (certified check $75,000)	
Proposition C	$1,258,835.00
2. Lindgren and Swinnerton and Barrett and Hilp (certified check $325,000)	
Proposition ABC	5,815,335.00
3. MacDonald and Kahn and J. F. Shea Co. (certified check $325,000)	
Proposition ABC	6,023,491.00
4. Hetch Hetchy Project	
Proposition ABC	5,257,665.00
Proposition A	2,205,590.00
Proposition B	1,984,575.00
Proposition C	1,152,525.00
Proposition AB	4,190,165.00
Proposition AC	3,358,115.00
Proposition BC	3,137,100.00
5. Youdall Construction Company and Geo. Pollock Co. (certified checks $75,000 and $125,000)	
Proposition A	2,327,433.00
Proposition B	2,110,045.80
Proposition C	1,373,767.00
Proposition AC	3,664,188.00
Proposition BC	3,448,974.67

On June 8, 1932 the Consulting Engineer wrote the Public Utilities Commission, recommending that the work be awarded to the Hetch Hetchy project. An energetic campaign was carried on by the Contractors to prevent the award to the low bidder. The Department's bid is $557,670 lower than the next lowest contractor's bid. Its estimate is conservative and the bid was made with full knowledge of the underground conditions as developed during the progress of the work to date and it has behind it years of experience in this particular type of tunneling.

After investigation and approval of the bid by the Controller, the Public Utilities Commission by Resolution 57 on July 25, 1932 awarded the contract to Hetch Hetchy project. Work under the contract began August 15, 1932. Operations have been carried on efficiently and economically and at a cost substantially lower than the price bid.

COAST RANGE TUNNEL—LENGTH AND PROGRESS OF CONSTRUCTION UNITS

Working Points and Date Holed Through	Depth of Shaft	Distance	Tunnel Driven in 2 Years	Tunnel Driven 6/30/33	Tunnel to be Driven	Gunite Lining Placed	Concrete Lining Placed 6/30/33 Invert	S. & A.
Tesla Portal W.				13,904				
3/4/31		23,310						
E.				9,406		1,479	22,970	22,967
Thomas	348							
W.			6,635	12,801		7,562	11,170	
6/7/33		22,448						
E.			6,861	9,647		1,791		
Mitchell	812							
W.			7,472	11,274		6,051		
		27,966			2,676			
E.			7,144	14,016		7,475		
Mocho	823							
W.			1,897	7,926		1,587		
5/12/32		15,303						
E.			1,976	7,377		2,586	14,212	14,122
Valle	376							
W.			3,818	11,286		6,156		
1/14/33		26,872						
E.			6,404	15,586		7,951	12,674	11,255
Indian Creek	301							
W.			875	3,951		858		
7/29/32		17,140						
Alameda E. Portal			273	13,189		1,302	15,964	15,960
Alameda W. Portal			316	8,806		186	18,192	18,192
8/11/31		18,192						
Irvington Portal E.			383	9,386				
TOTALS—Feet		151,231	44,054	148,555	2,676	44,984	95,182	82,496
Miles		28.64	8.34	28.13	0.51	8.52	18.03	15.62

Total Concrete and Gunite Placed

13.39	mi. of poured concrete
1.97	mi. Gunite with concrete inner shell
.64	mi. Gunite with surface finish
4.85	mi. Gunite ready for concrete inner shell
1.06	mi. Gunite ready for surface finish
21.91	

Concrete Lining Placed

13.39	mi. of poured concrete
1.97	mi. Gunite with concrete inner shell
.26	mi. Gunite with surface finish
15.62	

Gunite Lining Placed

1.97	mi. with concrete inner shell
0.64	mi. with surface finish
4.85	mi. ready for concrete inner shell
1.06	mi. ready for surface finish
8.52	

Tunnel Driving:

Tesla Portal:—Driving between this camp and Thomas shaft was completed during the fiscal year 1930-31. The camp was closed down but the compressors were operated for concreting and guniting operations in the tunnel to Thomas Shaft. Upon completion of this work the buildings were sold and the camp site cleaned up.

Thomas Shaft:—The west tunnel was advanced 6,635 feet during the two year period, to a total length of 12,801 feet, through various formations such as broken shale with clay seams, broken chert with clay seams, black gouge, hard chert and sandstone. Much of this was running ground which required spiling and breast boarding. Squeezing ground developing heavy pressure was later encountered, which required gunite concrete instead of timbering. Gunite lining was placed in 4,499 feet of tunnel during the two years, making a total length of 7,562 feet.

In planning the Corral Hollow emergency pipe line it was found impracticable to carry the 36-inch riser pipe from the tunnel up through the main shaft, so a special shaft 7 feet 6 inches in diameter was constructed for this purpose. This shaft is located 168 feet easterly from the main shaft. It was sunk and lined with gunite ranging from 8 inches to 12 inches thick at a cost of $22,336.33.

Mitchell Shaft:—Until holing through on June 7, 1933 the east tunnel was advanced 6,861 feet to a total length of 9,647 feet. Some zones of firm sandstone were encountered, but most of the ground was very difficult, consisting of crushed schist, black gouge, broken chert and clay, carrying much water and developing into running ground. Some methane was present.

During the two years 900 feet of gunite lining was placed, making a total of 1,791 feet.

The west heading penetrated sandstone, schist and clay, crushed schist, crushed shale and clay, and broken chert and clay. During the two years 7,472 feet of progress was made, to a total length of 11,274 feet. This heavy, squeezing ground required guniting immediately after excavation. Of this distance 4,322 feet were lined with gunite, making a total of 6,051 feet.

Mocho Shaft:—The east heading advanced 7,144 feet during the two years, to a total length of 14,016 feet. The ground penetrated consists of crushed shale, clay and boulders, sandstone and chert, crushed schist, broken chert and clay almost always requires gunite immediately after excavation. Total length of gunite lining is 7,475 feet, of which 5,466 feet were placed during the two year period. Between Mocho and Mitchell there remains 2,676 feet of tunnel to drive. This is the last unit of tunnel to drive.

The west heading advanced 1,897 feet through broken chert and clay, crushed shale and clay, clay and pebbles, until May 12, 1932, when it holed through to a connection with the east heading from Valle shaft. In much of this distance, gunite was placed immediately after excavating and no timber was used. Total length of tunnel is 7,926 feet of which 1,587 feet is gunite lined, 1221 feet having been placed during the period.

Valle Shaft:—The east tunnel advanced 1,976 feet through clay and compressed sand and clay, until May 12, 1932 when it holed through to Mocho west tunnel. Total length of tunnel is 7,377 feet, of which 2,586 feet is lined with gunite, 2,500 feet having been placed during the period. This tunnel penetrated a small hilltop of disintegrated granodiorite buried under fresh water gravels. This granodiorite is the same rock that forms the mass of the Sierra Nevada and this is the only instance in this region in which rock of this nature and antiquity has been discovered beneath the younger formations of the Coast Range.

The west heading advanced 3,818 feet during the period to a total length of 11,286 feet when it met the east heading from Indian Creek on January 14, 1933. It penetrated shale, sand and clay, crushed shale, and freshwater gravels. Heavy flows of water accompanied by some methane were encountered. At times these flows were intermittent and similar to geyser action. This ground exhibits great power to swell and squeeze. In consequence it was worked by spading and placing gunite immediately thereafter 4,142 feet of such lining having been placed during the period. Total length of gunite lining is 6,156 feet.

Indian Creek Shaft:—The east heading advanced 6,404 feet during the period to a total length of 15,586 feet where it holed through to the west tunnel from Valle. It penetrated sandstone and slate, crushed slate with clay seams, crushed schist with clay seams, sandstone, shale and freshwater gravels. The aggregate length of gunite lining is 7,951 feet of which 4,151 feet was placed during the two year period.

The west heading had encountered quicksand during the fiscal year 1930-31 as noted in the previous annual report. In July 1931 this heading was advanced 47 feet. A bulkhead was then put in and work discontinued while the water was allowed to drain from the sand. Work was resumed on February 9, 1932. A small top drift was then driven and progressively widened to full width of tunnel, after which the bench was excavated. The tunnel was advanced 875 feet during the period to a total length of 3,951 feet where it met the heading from Alameda east portal on July 29, 1932. Total length of gunite lining is 858 feet.

Alameda Portals:—On July 16, 1931 the east heading which had been driven 104 feet, encountered quicksand. The flow amounted to 2,000 gallons per minute and completely filled the tunnel for 450 feet from the face, tapering to nothing at a point 1,700 feet back. After a slight delay, this sand was cleaned out and a small drift was advanced 119 feet into the quicksand. The heading was then bulkheaded and work suspended, to allow the water to drain out, while driving was continued from the Indian Creek heading. Later on, driving was again resumed and the heading was advanced 169 feet to a connection with the tunnel from Indian Creek. Total length of heading is 13,189 feet, of which 1,302 feet is gunite-lined.

The west tunnel was driven 316 feet until August 11, 1931 when it holed through to a connection with the Irvington heading. The ground penetrated was sandstone and shale, with frequent zones of crushed shale. In these zones and in open seams, much water was encountered, so that grouting was frequently necessary to cut off the water flows. Total length of heading is 8,806 feet.

Irvington Portal:—The tunnel was driven easterly 383 feet to hole through on August 1, 1931 to the heading from Alameda Creek. Conditions were similar, in that much water was encountered which required frequent grouting. Total length of heading is 9,386 feet.

After a short period spent in cleaning the tunnel and taking down the bottom preparatory to placing concrete lining, the camp at Irvington Portal was closed down, excepting the compressors, which were operated for grouting and for placing concrete lining. Upon the completion of concrete operations the camp buildings were sold.

Tunnel Lining:

The tunnel is being lined with concrete for its entire length. In 1931 a program was adopted for the concrete operations as follows:

Wash, screen and store aggregate in the form of sand, rock from ¼ to ¾ inches and rock from ¾ to 1½ inches at gravel plants at three locations, Corral Hollow, Arroyo del Valle and Alameda Creek.

From a concrete plant at Thomas shaft, line the tunnel from Tesla portal to a point about 2½ miles west of Mitchell shaft, using aggregate from Corral Hollow. This distance was estimated to require about 180,000 cubic yards of concrete.

From a concrete plant at Alameda portals, line the tunnel westerly to Irvington portal and easterly to a point about 1½ miles east of Indian Creek. This distance was estimated to require 130,000 cubic yards of concrete.

From a concrete plant at Valle shaft, line the tunnel eastward to about 2½ miles east of Mocho, meeting the operations westward from Thomas, and work westward from Valle about 4 miles to meet the work eastward from Alameda. This section was estimated to require about 150,000 cubic yards of concrete.

This program, adopted after careful consideration of the probable time of completing the excavation in the various units of tunnel, should allow for progressive completion of lining operations soon after completion of excavation, and should provide release of concreting equipment in satisfactory rotation, keeping the amount of equipment at a minimum. The excavation of the last section, that from Mocho to Mitchell, should be completed in the fall of 1933. According to this program it should be possible to prosecute the concreting of this section with two crews, one working east from Valle and one working west from Thomas, so as to finish the work with the greatest speed.

The program is working satisfactorily. Placing of concrete began at the end of the previous fiscal year. To date, concrete and gunite lining has been placed in 21.91 miles of tunnel. This consists of 13.39 miles of full concrete section, 1.97 miles of concrete inner shell in gunite circle, 0.64 miles of gunite circle with surface finish, and 5.91 miles of gunite still requiring finish.

Timbering:

Standard tunnel timbering consists of vertical posts and four or six segments to the arch. Generally the sets are spaced at 5 foot intervals but this spacing varies from 2½ feet in the heaviest ground to 8 feet in the most favorable. Occasional short lengths of tunnel in sound rock are untimbered. Where timber must be spaced closer than 5 feet it is customary first to place the timbers at 5 feet and later to install the intermediate sets.

The size of timbers used varies according to the nature of the ground. Where only a light load is to be carried, 8x8-inch timbers are used; moderately heavy ground requires 10x10 or 12x12-inch; while very heavy ground requires 16x16 or even 16x24-inch timber. In much of the newly driven tunnel the use of these very heavy timbers has been superseded by construction of quick-setting gunite concrete lining which remains permanently.

Lagging is generally 2x12-inch boards. Usually, open lagging in the arch with none in the sides has been sufficient, but in soft, sandy ground it has been necessary to set tight lagging covering the entire surface of sides and arch. Crown bars, spiling, full circle timber sets and other special methods are used when the nature of the ground requires.

Timbers 12 inches or less in width are placed so as to give 8 inches minimum clearance from the finished inside face of lining, including an allowance for possible shifting of timbers previous to construction of lining. This provides for six inches minimum thickness of concrete between the finished inside face of lining and the inside face of timbers. Where timbers are thicker than 12 inches a correspondingly greater clearance is allowed. Additional space is allowed at the crown to provide for manipulation of the discharge pipe of the concrete gun. Just prior to placing concrete lining, the timbering is removed to as great an extent as safety permits. In untimbered tunnel, the excavation is made large enough to give 10 inches minimum thickness of concrete lining.

Design of Concrete Lining:

The thickness and class of concrete lining are determined in the headquarters office and are based on consideration of pressure measurements on certain test sections of lining, and on the observed condition of the timbering after having been in service. The thickness varies ordinarily from 10 inches to 30 inches but in a few exceptional cases, especially heavy pressures have required as much as 36 inches. The average thickness, exclusive of overbreak, lies between 18 and 21 inches. Overbreak in sides and arch averages 4 to 6 inches. Where the lagging can be removed, the concrete to be placed in overbreak is considered as effective in carrying the load to such extent as the form of the overbreak permits.

External ground loads causing bending and thrust on the timbers are computed from strains on a large number of timber sets as measured by a strain gauge. The ultimate strengths of these timbers thus measured are checked against timber tests made by the U. S. Forest Service and Cornell University. This method of estimating loads is not used for long period

COAST RANGE TUNNEL, TEST SECTION

measurements to determine gradually increasing loads where such occur, as the moisture in the tunnel results in inconsistencies and the method is difficult of application.

The best available means of determining external loads on the tunnel is by measurement of strains in short sections or rings of concrete lining placed by the gunite process. These rings may be placed against the undisturbed ground in thicknesses as desired, within a very short time after excavation. Gunite under continued load deflects like any other concrete, due to both elastic and plastic properties. The amount of plastic flow decreases with time but increases with the intensity of pressure.

To determine properly the loads in the test sections, the elastic and plastic properties of the gunite under various conditions of age and loading are studied by the use of plastic flow testing instruments, by strain gauges reading to ten one-thousands of an inch, and by gunite test specimens. Measurement of total deformation for each loaded specimen is corrected for shrinkage by comparison with similar measurements on an unloaded specimen of the same age.

Special measuring rods and metal plugs set in the gunite test sections of lining are used to measure the actual deflections across the diameter of the tunnel in vertical, horizontal and 45 degree diagonal directions. An elastic analysis of the tunnel section corrected for plastic flow was developed to determine the loads corresponding to the measured deflections at various points in the tunnel and the variation of these loads as time develops. The loads thus derived are used to determine the corresponding loads on the yielding timbers. Both the loading on timbers and that on the gunite test sections are then used to fix the thickness and strength of concrete necessary to support the external load on the tunnel lining.

Class of Concrete:

The standard concrete is proportioned to give a strength of 3000 pounds per square inch in 28 days. This requires 5¼ sacks of cement per cubic yard for invert where a comparatively dry mix is used, and 6 sacks per cubic yard for sides and arch where pneumatic placement necessitates use of a wetter mix. If the excavation is not sufficiently large to provide the required strength with 3,000-pound concrete, the cement content is increased to produce 4,000-pound concrete. The use of concrete of greater strength than 4,000 pounds is not desirable so any demand for further strength is met by re-excavating until sufficient thickness is available to develop the requisite strength with 4,000-pound concrete. After the concrete has set for 30 days the surrounding rock is grouted, using the same gun that was used in placing the concrete.

All materials, except water, entering into the concrete are measured by weight. In general, concrete having a slump of not over one inch is used in invert and floor where reinforcement is not required, and concrete having a slump of not over four inches is used in those portions of the tunnel lining placed by means of a concrete gun and in thin-walled structures not reinforced.

The general practice is to place the invert first and to follow this later by placing sides and arch. In very difficult ground the invert, sides and arch are poured in one continuous pour. Check levels are run to see that any swelling ground has absolutely come to rest before placing invert.

Gunite Concrete Lining:

A portion of the lining is gunite which was placed during the excavating operations as the most satisfactory method of maintaining the bore. The gunite consists of 3 parts of sand to one of cement, 3 gallons of water per 100-pound sack of cement, and 3 per cent of calcium chloride. Some of the sand is lost in rebound during placing. This mix gives a strength well in excess of 6,000 pounds per square inch. In rapidly squeezing ground, quick-setting or high early strength cement is used, but on account of its increased cost its use is held to a minimum.

The thickness of gunite lining is based on the same considerations that obtain for concrete lining and is usually determined by the field engineer. Generally about 15 inches is sufficient. The gunite concrete is left from 9 to 12 inches back from the finish line and the remaining thickness is shot in by the concrete gun as part of the regular lining operations, or else it is brought to within an inch or two of the finish line so that the remaining thickness may be plastered with cement mortar and troweled to a smooth finish. Before plaster or concrete is applied to gunite lining extreme care is taken to clean the exposed surface by water jetting and by use of wire brushes and picking. After gunite lining is placed, the voids in the surrounding rock are filled by high pressure grouting, using either neat cement or cement and sand forced in by a pressure exceeding 100 pounds per square inch. The aggregate length of gunite lining placed to date is 44,984 feet of which 27,265 feet was placed during the two year period.

Bulk Cement:

A substantial saving is being made by using bulk cement instead of sacked cement in the major part of the lining operations. The principal saving is in transportation from the railroad station to the camps and handling at these points.

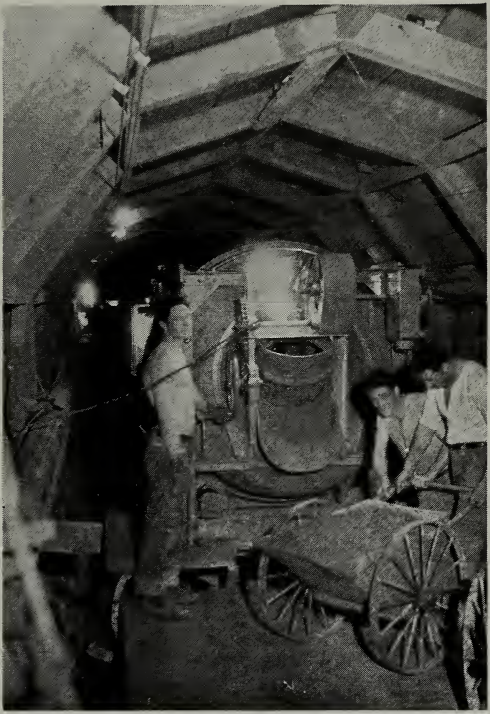
The cement is hauled from the plant by rail to receiving points at Moy, Sunol and Livermore. Ordinary box cars are used, but a little care in selection of reasonably tight cars results in no loss of cement in transit. At Moy the cement is unloaded by scraper into a steel tank for transfer to trucks for delivery to camps from Mitchell easterly. At Sunol, the distributing point for Indian Creek and Alameda Camps, the cement is unloaded from cars into a steel tank of two-car capacity by means of a Fuller-Kinyon cement pump. A similar unloading plant was installed at Livermore to serve the camps at Mocho and Valle. The cars are unloaded by a Fuller-Kinyon pump into a tank with capacity of 150 tons or 2½ cars.

Lining from Thomas Shaft:

The first unit of tunnel to be lined with concrete was the section 4.4 miles in length from Tesla portal to Thomas shaft where this work began on June 26, 1931.

The concrete plant at Thomas consists of steel tanks with elevators to receive the bulk cement from trucks, and bins to receive and store the aggregates produced at the gravel plant in Corral Hollow.

At Thomas Shaft the concreting operations in the east tunnel were carried on simultaneously with the driving operations in the west tunnel. Interference between the two operations was avoided by dropping the dry concrete from the surface to the tunnel through a 16-inch well with 10-inch extra heavy pipe casing set in concrete, which was specially constructed for this purpose. This well delivered the dry aggregate directly to cars in the tunnel.



COAST RANGE TUNNEL, CONCRETE LINING
Mixer and buggies used for transporting concrete when placing invert.

Each concrete car has three compartments each of which contains a batch for the 21 cubic feet, mixer. Upon arriving close to the mixer, the cars are spotted, one at a time, and unloaded by batches onto an inclined conveyor belt which carries the dry, mixed aggregate up to the mixer. Here water is added and the batch is mixed, ready to place. If invert is being poured the concrete is handled from the mixer in buggies or by a conveyor; for sides and arch a pneumatic gun is used. The steel forms are collapsible in lengths of about 20 feet and can readily be moved with a light "Jumbo" traveler. The combined mixing and placing plant is portable, being mounted on trucks that run on the regular 2-foot gauge tunnel track.

Concrete lining between Tesla portal and Thomas shaft, a distance of 23,310 feet was completed during the year 1931-32, except for a section 340 feet long lying just east of Thomas shaft. Lining of this section was deferred as it may possibly be used for a pump station of the Corral Hollow pipe line. Grouting followed the completion of concrete lining. Concrete invert has been placed in 11,170 feet of tunnel between Thomas and Mitchell shafts.

Lining from Valle Shaft:

During the fiscal year 1932-33 a plant for concrete tunnel lining was erected at Valle camp. The usual rock and sand bunkers and a 150-ton bulk cement tank were erected. All aggregate and cement are weighed by automatic batch weighers.

A 10-inch diameter well 309 feet deep was drilled to the tunnel level to facilitate the lining operations and to minimize interference with tunnel driving. The well is lined with 10-inch diameter extra heavy pipe and is of the same construction as the well at Thomas shaft.

The concrete lining between Mocho and Valle shafts has been completed except the portion next to the crosscut at each shaft, which will be poured at the time of placing the junction structures. Grouting in this distance has also been completed and the crew will now begin to place lining in the section west of Valle shaft.

Lining from Alameda Portals:

The concrete plant at Alameda Creek is substantially similar to that at Thomas shaft except that the aggregate is hauled directly into the tunnels without its being necessary to sink a shaft or well. Gravel and sand are available in stock piles produced by the portable gravel plant. Cement is hauled from the railroad station at Sunol and received in a steel tank with elevator. A weighing device is used to determine the amount of cement per batch. All aggregate is also weighed.

COAST RANGE TUNNEL, CONCRETE LINING
Placing and screeding concrete in invert.

The tunnel from Alameda Creek to Irvington portal was holed through in August 1931. The next operation consisted of taking down bottom, trimming, some retimbering and other preparations for placing lining. Concreting work began in November 1931, and was completed in June 1932. This was followed by grouting with a pressure of approximately 60 pounds. It is possible that further grouting with higher pressures may be resorted to so as to maintain the flow of surface springs and prevent the infiltration of subsurface water into the tunnel.

In April 1932, placing of concrete lining in the section between Alameda and Indian Creek was begun. After this had been completed and grouted, work began at a point about 2.4 miles east of Indian Creek, working back toward Indian Creek. Except for a short distance at the crosscut, this has been completed and grouting is now in progress. This practically completes the placing of concrete lining from Alameda portals.

Alameda Creek Syphon:

A pipe line 3,000 feet in length will be laid across the valley of Alameda Creek to connect the two main sections of the Coast Range tunnel. The tunnels, 10-feet-6-inch diameter at the portals will be extended by steel pipe, lined with mortar and jacketed with concrete, to manifolds with 72-inch diameter connection. On the east side near the manifold, a 60-inch diameter butterfly valve will be installed. A short distance westerly will be a 48x36-inch nozzle with gate valve for the proposed Water Department pipe line

COAST RANGE TUNNEL, IRVINGTON PORTAL
Shows 10½-foot diameter steel insert piece ready for connection to the Bay Crossing Pipe Line.

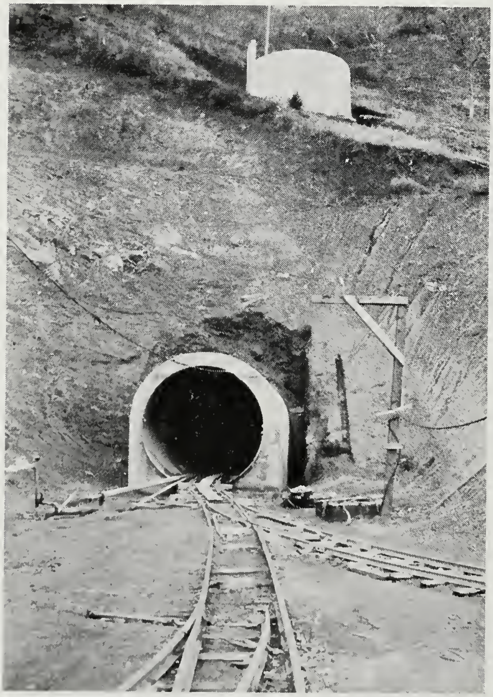
from Calaveras Reservoir. This connection will allow delivery of water from Calaveras reservoir to Crystal Springs reservoir by gravity, and will eliminate the present pumping at the Bay-Pulgas pump station.

The Alameda siphon and the connection at Tesla portal already described, will be constructed under one contract, for which bids will be received on July 7, 1933. Alternate bids will be received for 72-inch diameter steel pipe or 69-inch diameter steel cylinder reinforced concrete pipe. It is planned to have this work completed by December 1933.

Overflow Structures:

To prevent undue pressure in tunnels and pipes, concrete lined overflow shafts are provided at Tesla portal, and at both portals at Alameda Creek. The shaft at Tesla portal has been described in the previous annual report.

The structure at each of the two Alameda Portals consists of a shaft of circular section with a circular overflow lip at the surface. In the east overflow structure the top is at elevation 415 feet and the lip at 408 feet. Tunnel invert is 332.83 feet. The shaft is 5 feet in diameter from the tunnel up to elevation 388 feet and then increases in 20 feet to 9 feet diameter. The water overflowing will be conducted in a pipe varying from 60 to 39 inches in diameter from the overflow shaft down the hillside to a reinforced concrete baffle structure beside a natural watercourse. This arrangement will prevent damage by erosion of the adjacent land. The discharge capacity will be 250 million gallons daily. The west structure is almost identical in design. The top elevation is 411 feet, lip 405 feet, and tunnel invert 329.07 feet. The discharge pipe is to be 69 inches diameter concrete pipe at the upper end, reducing to 36 inches in the lower portion, with a capacity of 240 million gallons daily. A portion of the existing Corral Hollow pipe line, 36 inches in diameter, will be used for the lower end of the discharge pipe.



COAST RANGE TUNNEL, ALAMEDA
WEST PORTAL
Tunnel portal with 10½-foot diameter steel insert piece ready for pipe connection. Overflow structure in background.

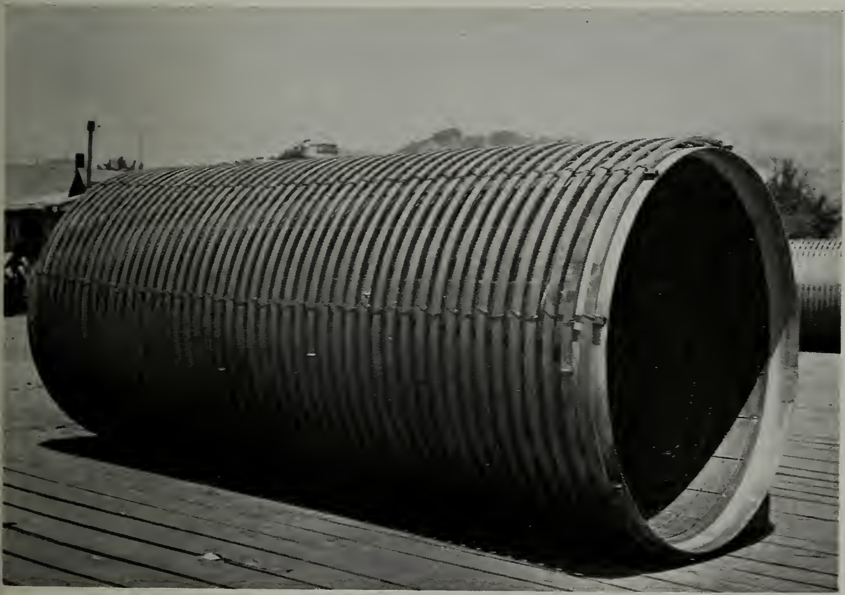
At present, the west overflow shaft is completed. The lining was placed by the gunite method. Construction of the east overflow is now under way.

Aqueduct, Bay Crossing Division:

This division extends from Irvington portal to Crystal Springs reservoir of the Water Department, in San Mateo County. It consists of approximately 21 miles of pipe and 1¾ miles of tunnel. The pipe line as at present constructed, begins at the Western Pacific Railroad 1.4 miles westerly from Irvington portal. From this point it continues as 5-foot diameter riveted steel pipe to Pulgas tunnel, except that Newark slough and the deep, navigable channel of San Francisco Bay at Dumbarton Strait are crossed by submerged, flexible joint, 42-inch diameter cast iron pipe aggregating one-half mile in length. Across the shallow portion of the Bay the 5-foot pipe is laid on a steel bridge three-fourths of a mile long, supported on concrete piers. On the areas of salt-marsh adjacent to the Bay, the pipe is carried on a timber trestle just high enough to protect it from the action of the salt water.

This division of the aqueduct is used and maintained by the Water Department. A 44-inch diameter steel pipe conducts water from Niles reservoir of its Alameda Creek system to the beginning of the 5-foot pipe for transmission to Crystal Springs reservoir.

Bids for construction of the connection from Irvington portal to the existing pipe at the Western Pacific Railroad were received February 24, 1933. Contract was awarded to American Concrete and Steel Pipe Company,



BAY CROSSING DIVISION

57-inch diameter steel cylinder reinforced concrete pipe. Steel cylinder and cage before concreting.

BAY CROSSING PIPE LINE

57-inch diameter steel cylinder reinforced concrete pipe. Completed section 12 feet long.

the lowest bidder, for the estimated price of $129,576.70. The highest of the six bids was $144,694.25. The specifications allowed alternative bids for 60-inch diameter steel pipe or 57-inch diameter steel cylinder reinforced concrete pipe. The successful bid provides for the use of the latter.

The 10½-foot diameter tunnel will be extended as steel pipe to a spherical manifold with 3 outlets 6-feet diameter and a 16-inch blowoff nozzle. A short distance beyond the manifold there will be a 60-inch diameter butterfly valve. Taper sections for a Venturi tube are also to be constructed. A 36-inch valve will be cut into the Water Department's 44-inch pipe near the junction point. Reinforced concrete houses will be erected for the butterfly valve and the Venturi meter section.

The contractor established a yard in Niles and is making good progress in preparing pipe sections 12 feet in length. Work under the contract should be completed by November 1933.

FINANCE

Hetch Hetchy Bond Purchase Syndicate:

During the fiscal year 1930-31, Hetch Hetchy 1928 bonds amounting to $12,000,000 had been sold, leaving $4,000,000 of bonds still remaining in the treasury. In March 1931 the Board of Public Works, upon recommendation of the City Engineer, had requested the Supervisors to sell all of the bonds on hand but this had not been done. On October 20, 1931 a similar request was made to sell $2,000,000 of the $4,000,000 on hand. The sale was attempted on November 23, 1931, but owing to the poor condition of the bond market and the charter requirement that the bonds could not be sold below par, there were no bidders. The Treasurer was thereupon instructed to sell $2,000,000 of bonds "over the counter." A few bonds were sold in this manner but it was evident that unless substantial funds were secured, the work must be shut down and 1300 men thrown out of employment.

Contractors and material men were solicited, with some success, to take all or part of their pay in bonds, but the greatest financial aid came from the employees' organization "Hetch Hetchy Bond Purchase Syndicate."

At a meeting of employees held in Livermore on January 30, 1932 it was suggested voluntarily that employees buy Hetch Hetchy bonds at par in sufficient quantity to continue the work. The suggestion was met with enthusiasm and steps were taken to effect an organization to accomplish this purpose. Chief Engineer O'Shaughnessy recommended to the Public Utilities Commission that the offer be accepted, and his recommendation, was approved.

The employees organized the "Hetch Hetchy Bond Purchase Syndicate" and appointed a committee consisting of Willis O'Brien, Chairman, Lloyd Nelson, and W. H. Snell, to take charge.

The syndicate plan required a great deal of study and advice from the legal profession, bankers and brokers, before it could be safely launched. The committee received valuable aid from the law firm of Orrick, Palmer and Dahlquist, Mr. Jas. K. Lockhead of the American Trust Company, Mr. Ross Thompson of the American Securities Company, and many members and representatives of investment bond houses who cheerfully gave their time to the solution of the case.

Every employee authorized a deduction of 10 per cent of the gross amount of his pay from each payroll from February 1 to June 30, 1932. These contributions were collected by the Syndicate. At each payday, bonds were purchased at par by investment houses and sold at the market price, the difference being supplied by the Syndicate. The carrying out of the plan entailed many hours of rush work by the committee and the accounting employees, all of which was done gratis. It is the first time on record in construction works in this country that such a plan has been undertaken and consummated.

After June 30, 1932, the end of the contribution period, the work was financed from the sale of the remaining 1928 bonds along with bonds authorized in the election of May 3, 1932, and the Syndicate closed its books and refunded to its members by 2700 checks, the unused portion of their contribution. The Chairman of the Committee issued a final statement as follows:

Contributions by members			$123,292.66
Being 10% of gross earnings			
From the gross earnings amounting to		$1,232,926.60	
Deductions for board, lodging, hospital, etc., were returned to the City Treasury to the amount of		188,465.24	
Leaving a net sum to be taken up in bonds		$1,044,461.36	
Deduct			
Discount on bonds sold		$ 61,170.00	
Par value	$1,045,000		
Proceeds (94.15% of par value sold)	983,830		
Expenses			
Legal services, agreement and advice	$250.00		
U. S. Government tax on distribution checks	53.40		
Rubber stamp for committee	1.25		
Gross expenses	$304.65		
Credit for interest earned on bank balances	139.36	165.29	
Total deductions—49¾ cents per dollar contributed			61,335.29
Balance for distribution—50¼ cents per dollar contributed			$ 61,957.37

The employees in thus financing the work, showed a genuine sense of responsibility toward the Hetch Hetchy Project and the City and County of San Francisco in averting what appeared to be a certain shut-down of the construction activities which would have resulted in serious delay and loss of large sums of money by the City.

During the period of contribution to the Syndicate, employees were relieved of the obligation of donating to the Unemployment Relief Fund. Employees of the Hetch Hetchy Power Operative force did not contribute to the Syndicate, except for such time as they were engaged on Hetch Hetchy construction.

Bond Issue of 1932:

When the bond issue of 1928 was authorized by the electorate it was expected that the funds provided would be sufficient to complete the aqueduct and bring the water to the local reservoirs. This expectation was not realized, however, due principally to a series of several unprecedentedly dry winters in which the rainfall was insuffiicent to provide proper storage of water in the local reservoirs of the Water Department. The emergency construction to overcome this condition was noted in the previous annual report. No other money being available, it was necessary to use Hetch Hetchy funds.

To replace this money and to provide for other expenses, it was decided to submit to the voters at a special election on May 3, 1932, a proposition to issue $6,500,000 bonds for Hetch Hetchy purposes. After a vigorous campaign the issue was authorized by the vote: For 128,691, Against 9,373. This ratio of 14 to 1 shows the faith of the citizens in the enterprise.

The following statement shows the status of the various Hetch Hetchy bond issues as of March 15, 1932.

Year	Rate	Authorized	Sold	Annual Redemption	Redeemed	Out-standing
1908	4½%	$ 600,000	$ 600,000	$..................	$ 600,000	$..................
1910	4½%	45,000,000	45,000,000	1,000,000	12,000,000	33,000,000
1925	5%	10,000,000	10,000,000	250,000	750,000	9,250,000
1928	4½%	24,000,000	20,823,000	600,000*	....	20,823,000
TOTAL		$79,600,000	$76,423,000	....	$13,350,000	$63,073,000

* Begin in 1938.

On June 20, 1932 the Board of Supervisors received bids on all unsold bonds of the 1928 series and for $5,477,000 of the 1932 series.

The 1932 bonds were advertised to "bear interest at a rate or rates not exceeding six per centum per annum, as shall be named by the bidder, and bidders for said bonds shall specify in their bids the interest rate or rates desired, not exceeding six per centum per annum. . . ." "The bonds will be awarded to the bidder or bidders offering to purchase the same, bearing the lowest rate or rates of interest. . . ."

Sale was made to a syndicate as follows:

$1,359,000 of 1928 bonds bearing 4½% interest
$4,325,000 of 1932 bonds bearing 5¾% interest
$1,152,000 of 1932 bonds bearing 5 % interest

for the sum of $6,836,000 and accrued interest at the date of delivery. This assures the financing of the work to completion.

CONTRACT PAYMENTS FROM BOND FUNDS

	1910 Fund	1925 Fund	1928 Fund	1932 Fund	Total
Contracts completed to June 30, 1931	$25,936,262	$1,696,118	$..................	$..........	$27,632,380
Contracts completed, 1931-32 and 1932-33	....	675,958	6,327,225	....	7,003,183
Total contracts completed to June 30, 1933	$25,936,262	$2,372,076	$6,327,225	....	$34,635,563
Contracts not completed	....	....	....	11,375	11,375
Total paid—all contracts	$25,936,262	$2,372,076	$6,327,225	$11,375	$34,646,938

Contract payments from Hetch Hetchy power operative depreciation fund during fiscal years 1931-32 and 1932-33..............................$42,776

CURRENT CONTRACT DATA 1931-32

Contract Number and Title	Contractor	Date Signing Contract	Time Allowed in Days	Date of Acceptance	Amount of Bid	Amount Paid	Bond Funds
113-E Excavating tunnels in Brown Section, Foothill Division	Connolly & De Luca	9/28/26	700	8/12/32	$ 779,745	$ 675,958	1925
121 Furnishing and delivering portable gravel plant	Link-Belt Company	3/27/30	75	7/11/32	44,612	43,075	1928
122 Construction of Newark-San Lorenzo Pipe Line	West. Pipe & Steel Co.	11/26/30	120	10/ 7/31	648,867	680,033	1928
123 Construction of San Joaquin Pipe Line	Youdall Constr. Co.	6/11/31	365	11/28/32	4,136,479	4,187,919	1928
124 Grading and Surfacing Mather-Hetch Hetchy Road	A. G. Raisch	7/29/31	150	11/14/32	125,714	146,998	1928
125-A Furnish and delivering relief Valves, San Joaquin Pipe Line	The Pelton W. W. Co.	12/ 2/31	120	6/13/32	25,010	25,010	1928
125-B Furnishing and delivering butterfly valve, San Joaquin P. L.	Joshua Hendy Iron Wks.	12/ 2/31	120	3/22/32	4,700	4,700	1928
126 Hauling cement, sand and gravel, Coast Range Division	Savage Trans. Co.	9/11/31	365	4/30/33	47,639	36,727	1928
127 Construction of steel pipe in the Lower Cherry Aqueduct	Steel T. & P. Co. of Cal.	9/16/31	45	3/ 7/32	42,287	42,776	*
128 Construction of Red Mountain Bar Siphon	MacDonald & Kahn Co.	11/18/31	195	7/25/32	174,369	180,831	1928
129 Construction of Corral Hollow Pipe Line	Youdall Constr. Co.	12/ 2/31	260	10/24/32	951,051	904,281	1928
130 Furnishing and delivering power transformers, Seco Substn.	Moloney Electric Co.	12/16/31	120	7/20/32	22,965	22,875	1928
131 Furnishing and delivering power transformers for pump st'ns	Moloney Electric Co.	1/11/32	100	7/20/32	22,620	22,620	1928

132 Hauling cement, sand and gravel, Coast Range Division..........		b.					
133 Furnishing and delivering centrifugal pumps, Corral Hollow P.L.	United Iron Works........	1/ 6/32	116	3/13/33	25,050	24,719	1928
134 Furnishing and delivering synchronous motors for pump stations	Electric Mach. Mfg. Co.	1/ 6/32	100	7/20/32	44,630	44,630	1928
136 Furnishing and delivering discharge and suction valves, Corral Hollow Pump stations........................		b.					
137 Construction of pipe line, Bay Crossing Division..........	Amer. Conc. & S.P.Co.	4/13/33	270	....	129,576	2,851	1932
138 Construction of Sunol Storehouse	Empire Constr. Co.........	8/22/33	40	11/ 3/33	2,877	2,807	1928
139 Hauling sand and gravel, Coast Range Division....................................		b.					
140 Hauling cement, Coast Range Division		b.					
141 Hauling sand, gravel and cement, Coast Range Division............	Meyer-Rosenberg	4/ 3/33	6/30/34	....	$ 91,485	$ 8,524	1932
142 Construction of pipe lines, Coast Range Division........................		b.					
143 Moccasin Sewage Disposal System		b.					
144 Furnishing and delivering two 60-inch butterfly valves......................	Joshua Hendy Iron Wks.	....	120	....	6,650	....	1932
145 Construction of Early Intake tailrace pipe line....................................							

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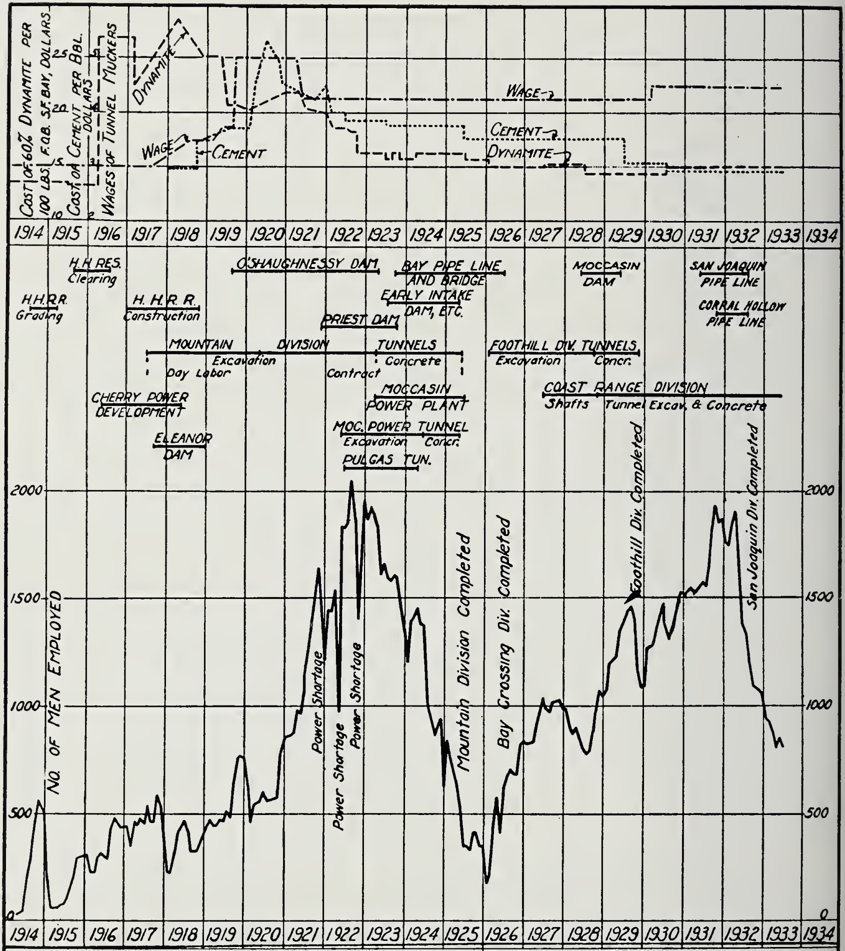
b—Specifications prepared but not issued.
*—Power Operation Depr.

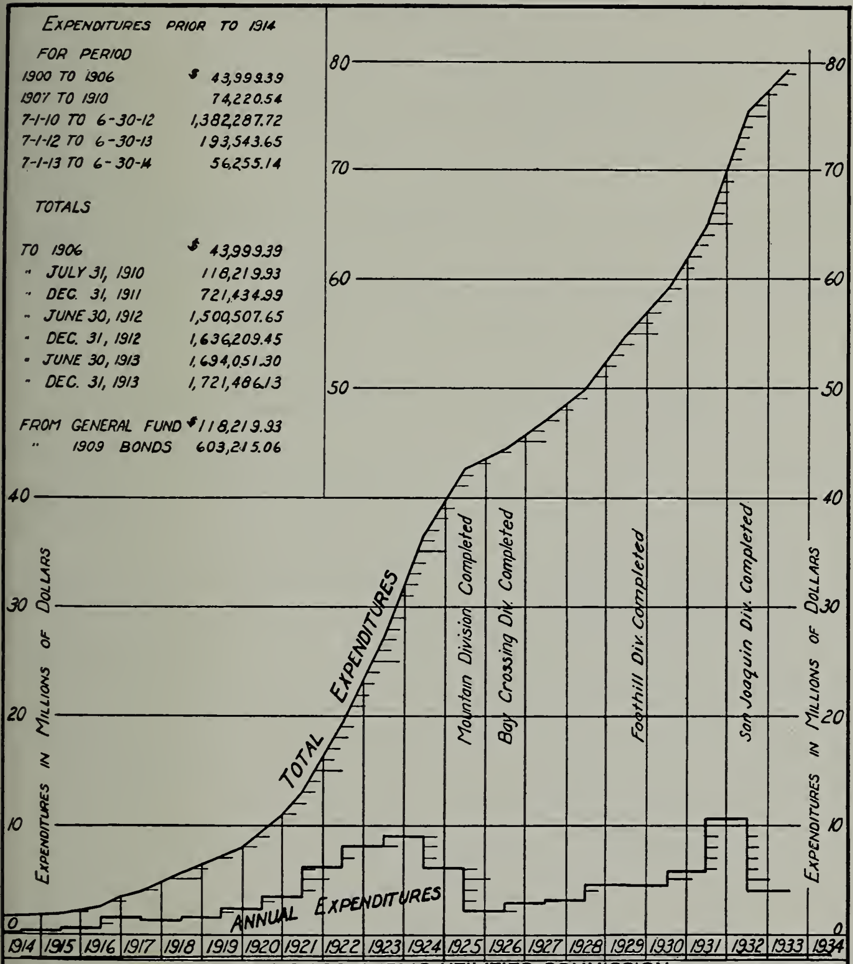


SAN FRANCISCO PUBLIC UTILITIES COMMISSION

HETCH HETCHY WATER SUPPLY

UPPER: GRAPHIC RECORDS OF COSTS OF LABOR AND MATERIALS.
LOWER: GRAPHIC RECORD OF NUMBER OF MEN EMPLOYED.
NOTE: EMPLOYEES IN THE SAN FRANCISCO OFFICES ARE NOT INCLUDED IN THE COUNT.

BY L.M.S. TR. L.M.S.	SCALE As Shown	DATE As Posted	DRAWING NO.
CH. J.H.T. OK	APPROVED	REVISED	A-392
APPROVED [illegible]	J. T. [illegible]		



EXPENDITURES PRIOR TO 1914

FOR PERIOD	
1900 TO 1906	$ 43,999.39
1907 TO 1910	74,220.54
7-1-10 TO 6-30-12	1,382,287.72
7-1-12 TO 6-30-13	193,543.65
7-1-13 TO 6-30-14	56,255.14

TOTALS	
TO 1906	$ 43,999.39
" JULY 31, 1910	118,219.93
" DEC. 31, 1911	721,434.99
" JUNE 30, 1912	1,500,507.65
" DEC. 31, 1912	1,636,209.45
" JUNE 30, 1913	1,694,051.30
" DEC. 31, 1913	1,721,486.13

FROM GENERAL FUND	$118,219.93
" 1909 BONDS	603,215.06

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

HETCH HETCHY WATER SUPPLY

GRAPHIC RECORDS OF

ANNUAL AND TOTAL EXPENDITURES.

BY L.M.S. TR. L.M.S. CH. J.H.T. OK APPROVED Leo Stocker	SCALE As Shown APPROVED	DATE As Posted REVISED	DRAWING NO. A-393

Expenditures for Construction, June 30, 1933

HETCH HETCHY DIVISION, completed and in operation: O'Shaughnessy Dam, clearing Hetch Hetchy Reservoir		$ 8,162,203.25
ELEANOR DIVISION, Eleanor Dam, clearing Lake Eleanor Reservoir		391,747.22
MOUNTAIN DIVISION, completed and in operation: Early Intake Dam and headworks, aqueduct tunnel (18.8 miles) and appurtenances		11,522,154.24
MOCCASIN DIVISION, completed and in operation: Priest Dam, power tunnel, penstock lines, power plant and transmission line, Moccasin to Newark		8,906,026.20
GENERAL UTILITIES, ETC., applying to above construction: Lower Cherry Power System, Sawmill, Hetch Hetchy Railroad, Boarding House, Etc.		4,000,633.23
FOOTHILL DIVISION, completed and ready for operation: Moccasin Dam and headworks, aqueduct tunnel (15.8 miles) and Red Mountain Bar Siphon		8,809,773.45
SAN JOAQUIN DIVISION, completed and ready for operation: Pipe Line (47.5 miles)		4,526,397.30
COAST RANGE DIVISION, under construction: 28.6 miles of aqueduct tunnel and appurtenances		20,413,113.67
BAY DEVELOPMENT, completed and in operation (requires 1.4 miles additional pipe to connect to Coast Range tunnel): Bay Crossing Pipe Line, Pulgas Tunnel, Etc.		5,742,206.78
GENERAL: Administration, engineering, legal, etc., reservoir, watershed and other lands, water rights, payments to U. S. Government and miscellaneous	$ 4,774,841.85	
Less Credits, rental of lands, sale of water, miscellaneous	214,986.14	$ 4,559,855.71
Total Expenditures from General Fund and Bond Funds for Construction of Hetch Hetchy Project		$ 77,034,111.05
Allocated to Power Development		21,866,835.25
Allocated to Hetch Hetchy Water Supply Construction		$ 55,167,275.80

MISCELLANEOUS, expenditures for evaluating the plants of the Pacific Gas & Electric Co. and the Great Western Power Co.	$ 392,006.43		
Less allocated to Power Development	220,883.88	$ 171,122.55	
EMERGENCY WATER SUPPLY, completed: Newark-San Lorenzo Pipe Line	$ 1,043,929.63		
Corral Hollow Pipe Line	1,220,701.30	2,264,630.93	2,435,753.48
Expenditures from Bond Funds and General Fund allocated to Water Supply Construction			$ 57,603,029.28
INTEREST DURING CONSTRUCTION:			
Allocated to Hetch Hetchy Water Supply Construction		$10,463,826.58	
Allocated to Emergency Water Supply:			
Total	$ 230,067.33		
Paid and payable by San Francisco Water Dept.	111,446.25	118,621.08	10,582,447.66
Total Expenditures for Water Supply Construction			$ 68,185,476.94

HETCH HETCHY WATER SUPPLY

Disposition of Funds Derived from Sale of Bonds, Advances and Surplus Earnings

June 30, 1933

		Total			Allocated to Power Development			Allocated to Water Supply		
Bond Issues	Authorized	Sold	Redeemed	Outstanding	Sold	Redeemed	Outstanding	Sold	Redeemed	Outstanding
1909 4½%	$ 600,000.00	$ 600,000.00	$ 600,000.00	$	$ 308,000.00	$ 308,000.00	$	$ 292,000.00	$ 292,000.00	$
1910 4½%	45,000,000.00	45,000,000.00	13,000,000.00	32,000,000.00	23,044,000.00	6,657,700.00	16,386,300.00	21,956,000.00	6,342,300.00	15,613,700.00
1925 5%	10,000,000.00	10,000,000.00	1,000,000.00	9,000,000.00				10,000,000.00	1,000,000.00	9,000,000.00
1928 4½%	24,000,000.00	24,000,000,00		24,000,000.00				24,000,000.00		24,000,000.00
1932 5%	1,152,000.00	1,152,000.00		1,152,000.00				1,152,000.00		1,152,000.00
1932 5¾%	4,325,000.00	4,325,000.00		4,325,000.00				4,325,000.00		4,325,000.00
1932	1,023,000.00									
	$86,100,000.00	$85,077,000.00	$14,600,000.00	$70,477,000.00	$23,352,000.00	$ 6,965,700.00	$16,386,300.00	$61,725,000.00	$ 7,634,300.00	$54,090,700.00
Advances from Taxes and Other Funds for Bond Interest and Redemption and Construction				20,850,483.76			4,010,909.26			16,839,574.50
Unamortized Premium on Debt				1,321,686.43						1,321,686.43
Original Premium			$1,629,097.47			$1,561.91		$ 1,627,535.56		
Credited to Interest During Construction			307,411.04			1,561.91		305,849.13		
Surplus from Earnings				7,033,373.84			7,033,373.84			
Total				$99,682,544.03			$27,430,583.10			$72,251,960.93
DISPOSITION OF THE FOREGOING:										
Construction, Interest During Construction and Additions and Betterments				$93,876,128.62			$25,861,774.23			$68,014,354.39
Expenditures for Evaluating Pacific Gas & Electric Co. and Great Western Power Co. Properties and Preliminary Surveys				392,506.42			221,383.87			171,122.55
Total Expenditures				$94,268,635.04			$26,083,158.10			$68,185,476.94
Cash Balances, Accounts Receivable and Other Current assets, less liabilities and reserves				3,776,579.24			519,151.83			3,257.427.41
Unamortized Debt Discount and Expense				1,637,329.75			828,273.17			809,056.58
Total				$99,682,544.03			$27,430,583.10			$72,251,960.93

HETCH HETCHY POWER OPERATIVE DIVISION

PAUL J. OST

Manager and Chief Electrical Engineer

Fiscal Year Ended June 30, 1933

(The report for the fiscal year ended June 30, 1932, will be found in the section immediately preceding.)

Organization:

The new Charter of the City and County of San Francisco which went into effect January 8, 1932, established the Public Utilities Commission and placed under its control all municipal utilities, street lighting, and the supply of gas, electricity and heat to all departments of the City.

In June 1932 the commission established two divisions or bureaus to handle the Hetch Hetchy power development and street and public building lighting. Paul J. Ost was appointed manager and chief electrical engineer of these divisions. Mr. Ost served as electrical engineer and chief electrical engineer under the city engineer since 1909 and is thus continued in duties which he had under the organization prior to the establishment of the Public Utilities Commission except in the matter of street and public building lighting which was previously under the control of the Supervisors.

Description:

In conjunction with the construction of the Hetch Hetchy water supply project, Early Intake power house was built in 1918 to supply electric power for the construction of the O'Shaughnessy dam and the Mountain division of the aqueduct. It is located on the Tuolumne River a short way above its junction with Cherry River. It takes water out of Cherry River through tunnels, flume, ditch and pipe line. After passing through the plant the water is discharged into the Tuolumne River.

Lake Eleanor, the capacity of which has been increased by a multiple arch dam, serves as a storage reservoir for this plant. The power house equipment consists of three Pelton-Francis horizontal shaft turbines connected to 1000 kva. General Electric generators. This plant has a large overload capacity and frequently produced 3600 kw. over long periods of time. The power is transmitted at 22,000 volts over a wooden pole line easterly to O'Shaughnessy dam and westerly to Moccasin power house. At the latter point connection is made to the Pacific Gas and Electric Company's Tuolumne circuit through which the surplus energy of the plant is now sold to the Pacific Gas and Electric Company. This connection was made in 1918 by order of the State Power Administrator to augment the power supply during the war period.

The arrangement of the aqueduct above the Early Intake plant permits of discharging all water available, or the excess not required at the Early Intake plant, above the Early Intake diversion dam on the Tuolumne River, thus making water from Lake Eleanor and Cherry River usable at the Moccasin power house.

The Moccasin plant is located on Moccasin Creek approximately three miles above its junction with the Tuolumne River. This plant, which was placed in service in August 1925, has four 20,000 kva. units, each consisting of two 12,500-horsepower impulse wheels mounted on the same shaft with a General Electric generator.

Water for this plant comes from the Early Intake diversion dam on the Tuolumne River through a 19-mile aqueduct terminating in the Priest reservoir which serves as forebay; leaving the Priest reservoir the water passes through a mile of tunnel before entering the penstocks. O'Shaughnessy dam forms the storage reservoir for the Moccasin system. Additional water, as stated above, may be drawn from the Cherry system.

The output of this plant is consigned to the Pacific Gas and Electric Company at Newark substation for delivery in San Francisco. A double circuit transmission line on steel towers extends more than 98 miles from Moccasin to Newark. At Seco substation, about 9 miles east of Livermore, this line is tapped for the power used in driving the Coast Range tunnels of the Hetch Hetchy water supply. This construction energy is carried at 22,000 volts on wooden pole lines to each camp of the Coast Range Division. A small amount of power is taken directly from Moccasin power house at 22,000 volts to various points along the Foothill division of the Hetch Hetchy aqueduct.

These two are the only developed power sites. There are however, three other locations where power may be generated, namely at Early Intake, where by the construction of a high level aqueduct, power may be developed from the water released from the O'Shaughnessy dam. Near the same location a second plant utilizing the water at high head directly from Lake Eleanor, could be installed. The third location is at Red Mountain Bar, below the Moccasin power house and at the point where the Moccasin-San Francisco aqueduct crosses under the Tuolumne River. The combined capacity of the two plants near Early Intake would be 66,000 kw. and the capacity of the plant at Red Mountain Bar 20,000 kw.

Operation and Maintenance:

The Power Operating Division works stretch over more than 70 miles of mountain territory and operate 98 miles of high tension transmission line, together with 45 miles of 22,000 volt transmission and about 200 miles of telephone circuit as well as roads, trails and a railroad connecting the various units.

This division is the only one operating east of the San Joaquin valley and therefore it has carried all work in connection with the operation and maintenance of the water supply facilities as well as power. This necessitates the operating organization performing a variety of work only a portion of which is purely electrical. All of the facilities are relatively new with the exception of those in connection with the Early Intake system which have been in service since 1918.

The work during the past year has consisted of ordinary routine maintenance and operation, together with some extraordinary work such as the replacing of a considerable number of poles on the 22 kv. transmission line which had reached a point where they were no longer safe. Similar work was done for some of the older telephone lines. These poles were all badly rotted at the ground line and the tops of them were badly checked and many of them riddled with woodpecker holes. These poles were all of native cedar. Most of them had been stubbed and the stubs were giving away. The new poles being put in are of western red cedar, all of those on the telephone line having a butt treatment of creosote. Those which have been put in on the 22 kv. line are poles originally purchased for the Corral Hollow pipe line which were not creosoted. These poles, if allowed to remain in storage, would soon become worthless. As they can be readily replaced should it be found necessary to construct the Corral Hollow pipe line, it was thought best to use them on the Mountain division.

The 22 kv. transmission line from Hetch Hetchy Junction to Oakdale portal was no longer necessary as all the construction work was completed. One of the wires was taken down and the other two were converted into a telephone line, thus releasing the telephone circuit which had about served its expected life.

On the Moccasin-Newark line vibration dampers had been installed during the preceding years. Some damage to the aluminum strands had occurred prior to their installation. During the autumn inspection was made at many points to determine the extent of this damage. These inspections had to be made between 10 o'clock at night and 5 o'clock in the morning when it was possible to take one of the circuits out of service. This inspection resulted in the Aluminum Company of America, who originally supplied the conductor, offering to furnish armor rods necessary to reinforce the aluminum strands at all points where there were serious breaks. They have also furnished without cost, splicing materials, permitting joints in the conductor showing deterioration on account of loose strands to be cut out and replaced with new sections of cable. The work of installing the reinforcements and the new joints is underway.

The past winter was unusually severe as an extremely heavy snowfall was experienced in the latter part of January. At the middle of the month the ground was bare; following two weeks of storm, the snow on the ground January 30th measured 102 inches deep. This heavy fall crushed the roofs of some of our buildings, broke down our telephone lines and closed all communication temporarily. With a new rotary snow plow which had been secured, it was possible, with the exception of a few days, to keep the railroad open as far as Mather. The rapidity with which the snow fell made it impossible to keep the automobile road between Mather and the Damsite open with the facilities available. Lake Eleanor was entirely isolated for more than two weeks. The State highway was not opened beyond Groveland until after the fifteenth of February when it was cleared as far as South Fork. Beyond that point no roads were open for several weeks. This indicates the necessity for continuing the use of the Hetch Hetchy Railroad as a means of communication. All of the roads except the State highway, are without surfacing and became impassable with the coming of winter storms. Some seasons these commence as early as the middle of October and continue as late as the first of May.

The surfacing of the road between Mather and the damsite as required by the federal government, was completed in August 1932. A portion of it had been completed during the year 1931-1932. Two or three places softened during the winter time; the unsuitable sub-grade material was replaced and drains constructed. The road went through the past winter in good form.

The turbines in the Early Intake power house were overhauled during the year. These require frequent overhauling due the fact that the water coming from Cherry River carries sand which cuts the wearing rings.

Careful consideration was given to the preparation of the 1933-34 budget and on account of the urgent request for rigid economy, the amount requested was cut to the lowest possible figure. Some work that should be done has been deferred. The amount set up for depreciation both for 1932-33 and 1933-34 was the actual amount to be spent in making replacements, no money going into the reserve fund. This is a practice which should not be continued into other budgets.

Water Conditions:

The precipitation during the early months of 1932 was quite heavy and the runoff rather late, so that the O'Shaughnessy dam spilled from May 27 to July 27, the amount of water spilled being 440,000 acre feet, or more than double the amount stored. Lake Eleanor continued to spill until July 28 when draft from storage was commenced. On August 5 the output of the Early Intake power house was reduced so as to divert the majority of the flow from the Cherry River to the Moccasin system.

The deficiency of rainfall during the autumn and early winter resulted in the emptying of the Lake Eleanor reservoir on the last of October and the depletion of the Hetch Hetchy reservoir late in January. In spite of the heavy January snowfall, the precipitation during the present year was only between 55 and 60 per cent of that of the preceding year. On account of the consistently low temperature, the runoff has been delayed, resulting in a very good start for the year 1933-34.

The depletion of water in storage necessitated the curtailment of power production at the Early Intake and Moccasin power houses. However, by the early part of April the stream flow had increased to such an extent that it was possible to restore the output to normal.

Power Production:

The amount of energy generated and its disposition is shown in the following tabulation. It will be noted that the amount of power used on the construction of the aqueduct through the Coast Range is decreasing. This will further decrease during the coming year as the work is brought nearer completion.

TABLE 1

GENERATION AND DISPOSITION OF ELECTRICAL ENERGY

	1932-1933 kw-hr.	1931-1932 kw-hr.
Generated by Moccasin Power House	463,399,500	341,809,500
Generated by Early Intake Power House	11,814,100	13,206,800
Purchased	None	None
Total Available	475,213,600	355,016,300
Consigned to P. G. & E. Co., Newark	410,323,200	289,452,000
Delivered to P. G. & E. Co., Tuolumne Circuit	8,690,000	9,687,000
Used at Power Houses	717,030	637,680
Used on Mountain Division	910,735	623,139
Used on Foothill Division	153,000	189,200
Used on Coast Range Division	26,828,500	33,434,000
Losses and Unaccounted for	27,591,135	20,993,281
Total Energy	475,213,600	355,016,300

Financial:

There follows a condensed comparative balance sheet showing assets and liabilities as of June 30, 1933. This indicates that while the investment in plant is almost $26,000,000, the outstanding long time bond debt is $16,386,300 and that this amount will be reduced by $512,100 July 1, 1933. The Power Division has been meeting all bond interest and redemption on the capital allocated to it and in addition out of surplus has contributed largely toward interest and redemption of other Hetch Hetchy bonds. It has also been able to make needed additions and betterments to the extent of more than $500,000.

The income from power operation has resulted in an appreciable decrease in the annual tax rate, as without the power operating revenue the interest and redemption of bonds would have come through taxation. The total gross revenue to June 30, 1933 has been more than $16,500,000.

The comparative income statement also attached shows the revenue, operating expenses and other charges for the past year, the preceding year, and cumulative since the Moccasin power house went into service in August 1925.

TABLE II

HETCH HETCHY POWER PROJECT CONDENSED BALANCE SHEET

June 30, 1933

ASSETS AND OTHER DEBITS:

Investment in Fixed Capital		$25,861,774.23
From 1909 and 1910 Bond Issues, General Fund, etc.	$25,349,100.63	
Additions and Betterments from Appropriated Income	512,673.60	
Current and Accrued Assets		295,450.73
Special Funds		307,122.02
Depreciation Fund	292,542.89	
Payroll Account	14,579.15	
Deferred Charges		2,402,163.21
Unamortized Debt Discount and Expense	828,273.17	
Railroad Commission Valuation (P. G. & E. and G. W. P. Companies)	220,883.88	
Prepayments: Rents	10,042.50	
Bond Interest and Redemption	1,333,662.07	
Preliminary Construction Expenditures	7,817.51	
Miscellaneous Deferred Charges	1,484.08	
Total		$28,866,510.19

LIABILITIES, RESERVES AND SURPLUS:

Long Term Debt—1910 Bonds			$16,386,300.00
Allocated to Power, August 16, 1925		$19,971,000.00	
Redeemed and Redeemable from Surplus Earnings to July 1, 1933	$4,096,800.00		
Bonds Maturing July 1, 1933 (See Prepayments)	512,100.00		
		3,584,700.00	
Advances from Other Funds			4,010,909.26
Allocated to Power		6,958,000.09	
Returned and Returnable from Surplus Earnings to July 1, 1933	2,716,961.15		
Advances Maturing July 1, 1933 (See Prepayments)	452,870.32		
Applicable to June 30, 1933	2,264,090.83		
Returned from Depreciation Fund	683,000.00		
		2,947,090.83	
Current and Accrued Liabilities			452,954.84
Miscellaneous Payables and Accruals		84,263.09	
Interest Due July 1, 1933 (See Prepayments)		368,691.75	
Reserve for Depreciation			982,972.25
Surplus from Income			7,033,373.84
Balance, June 30, 1932		5,999,733.96	
Net Income, Year 1932-33	1,060,328.74		
Delayed Income Charges (Account in 1932-33)	26,688.86		
		1,033,639.88	
Total			$28,866,510.19

TABLE III

HETCH HETCHY POWER PROJECT COMPARATIVE INCOME STATEMENT

Fiscal Years Ended June 30, 1932; June 30, 1933, and Period August 16, 1925, to June 30, 1933

REVENUES:

	Fiscal Year June 30, 1933	Fiscal Year June 30, 1932	Beginning Aug. 16, 1925 to June 30, 1933
Moccasin Creek Power House, Net	$2,127,194.33	$1,575,219.29	$16,536,117.09
Early Intake Power House	44,804.16	49,325.57	345,832.45
Interest Earned on Treasurer's Bank Balances	16,730.33	26,765.48	317,939.60
Interest Earned on Miscellaneous Bank Balances	200.81	325.38	526.19
TOTAL REVENUES	$2,188,929.63	$1,651,635.72	$17,200,415.33

OPERATING EXPENSES AND TAXES:

	Fiscal Year June 30, 1933	Fiscal Year June 30, 1932	Beginning Aug. 16, 1925 to June 30, 1933
Production	$ 164,360.57	$ 193,526.53	$ 1,355,947.85
Transmission	36,478.03	24,495.82	211,297.04
Distribution			152.45
Proportion P. U. C. Expense	15,200.00		15,200.00
General and Misc. Expenses	60,029.58	62,908.93	412,783.20
Depreciation	55,904.96	166,217.60	1,155,348.59
Taxes Assignable to Operations	3,403.08	4,317.04	34,497.67
TOTAL OPERATING EXPENSES	$ 335,376.22	$ 451,465.92	$ 3,185,226.80
GROSS INCOME	$1,853,553.41	$1,200,169.80	$14,015,188.53

DEDUCTIONS FROM GROSS INCOME:

	Fiscal Year June 30, 1933	Fiscal Year June 30, 1932	Beginning Aug. 16, 1925 to June 30, 1933
Interest on Long Term Debt	$ 737,383.50	$ 760,428.00	$ 6,434,473.50
Misc. Interest Deductions			46,225.12
Amortization of Debt Discount and Expense	55,841.17	57,826.45	474,427.21
TOTAL DEDUCTIONS	$ 793,224.67	$ 818,254.45	$ 6,955,125.83
NET INCOME TO JUNE 30	$1,060,328.74	$ 381,915.35	$ 7,060,062.70

Engineering:

The aqueduct connecting the Early Intake power house with the Cherry River contains a little over 3,000 feet of wooden flume on frame sub-structure. This flume was built in 1917 and 1918 and has been in constant service ever since with minor repairs. It is now no longer reliable and must be taken out of service shortly. Consideration has been given to various methods of displacing this piece of the aqueduct. It is possible to rebuild a wooden flume, to rebuild the flume with metal, to install a pipe or to construct a tunnel. The hillside along which the flume runs is quite steep and the lower portion of it adjacent to the flume has a tendency to shift. The flume is also subject to damage from rocks rolling down the hillside.

As the revenue from the water diverted from Cherry River amounts to nearly $300,000 a year, it seems very inadvisable to put in any construction which will be subject to damage or which will be of relatively short life as no changes are now contemplated which will eliminate the advantages of retaining the Lower Cherry River aqueduct.

Studies are being made for the construction of a length of tunnel paralleling the flume. This tunnel will all be through rock and will be free from surface disturbances and be permanent. Any method of replacing the flume with surface construction will necessitate the loss of the use of the aqueduct during the period of construction. The tunnel can easily be constructed without in any way interrupting the flow of water except for a short period necessary to make the connections at the two ends. The cost will probably not be more than 50 per cent more than a flume structure.

The Intake plant is located on the Tuolumne River below the diversion dam and all water used there is lost to the Moccasin plant, being released into the river. Water may be passed through the Cherry aqueduct past the Early Intake plant and discharged into the river above the diversion dam in which case it can be used at the Moccasin plant. As the head on the Moccasin plant is nearly four times that at Early Intake plant, it is more efficient to route water taken from Lake Eleanor storage to Moccasin.

By piping the discharge of the Early Intake turbines across the river and into an adit of the Mountain division of the aqueduct tunnel, it will be possible to put the water used at Early Intake through the Moccasin plant also. Thus water diverted from Cherry River will generate power at both Early Intake and Moccasin plants. The capacity of Early Intake will be reduced as about 25 per cent of its present head will be required to deliver the water into the adit. The arrangement proposed will permit of operating the Early Intake plant under its present head during spring months when there is nothing to gain by economizing on water, thus securing maximum output from the Early Intake plant.

The execution of this plan has been authorized and specifications are being prepared and the work will be completed during the coming year. The estimate of the cost of this work is $85,000. The estimated increase in annual revenue for the two plants combined is $85,000, thus the estimated increased revenue will pay for the work during the first year after the change.

Red Mountain Bar Power House:

After leaving the water wheels at the Moccasin power house the water enters a re-regulating reservoir at the upper end of the Foothill tunnel. This tunnel extends 5¼ miles to Red Mountain Bar where the aqueduct crosses under the Tuolumne River by means of an inverted siphon.

The average amount of water passing through the Moccasin power house is 720 second feet. It is planned to initially transmit 93 cubic feet per second to San Francisco leaving 627 cubic feet per second to be spilled back into the Tuolumne River at Red Mountain Bar Siphon. This water may be used for power generation until the capacity across the San Joaquin valley is increased by the addition of more pipes. This excess water will be under a head of close to 300 feet.

By the installation of a power house on the east side of the River, a peak capacity of 20,000 kw. can be secured at a cost of $1,000,000, or $50 a kw. As this is about half the cost of a steam plant and much less than the normal cost of hydro-electric power, the development will produce attractive financial results. If the output of this plant were disposed of under the same terms as that from the Moccasin plant, the power revenue would pay for the plant in 3 years.

Estimates and reports have been prepared with a view to securing money for the building of this power house under the National Recovery Act under which 30 per cent of the cost of the labor and material entering into the job would be in the form of a grant from the federal government. If this can be done the plant will repay the indebtedness incurred in considerably less than 3 years.

Raising O'Shaughnessy Dam:

As indicated heretofore, it is not unusual to exhaust the stored water at both Lake Eleanor and Hetch Hetchy reservoirs sometime during the winter. This comes about because the Moccasin plant was built for the ultimate water capacity while the storage reservoirs have been built for only a part of the ultimate requirements. Some years with early Fall rains and average precipitation, there has been sufficient water with our present storage to go through the season without reduction of power output. The O'Shaughnessy dam as now constructed impounds 206,000 acre feet. The structure as built, was intended to be increased, when necessity demanded, to a height which would impound 348,500 acre feet.

With this storage, under anything but the most exceptional series of dry years, year-round operation of the Moccasin plant at full capacity would be assured. The estimated cost of building the dam to its ultimate height is $3,500,000. If this can be financed under the National Recovery Act, the average annual increase in revenue would make the project self liquidating. Estimates of cost and estimates of financial results of all of the above projects have been made with the forces of the Hetch Hetchy Construction Division and the Hetch Hetchy Power Division working in conjunction.

During the year plans were prepared for the electrical installation in the pumping plants on the Corral Hollow pipe line and a survey was made after the completion of the San Joaquin valley pipe line, to determine what if any preventive measures were necessary to prevent damage through electrolytic action. Small currents were found to exist but they are not such as will cause damage worthy of consideration.

STREET AND PUBLIC BUILDING LIGHTING DEPARTMENT

PAUL J. OST

Manager and Chief Electrical Engineer

Fiscal Year Ended June 30, 1933

This is a new Department established in June 1932. Under the old Charter, all of this work was handled through the Board of Supervisors.

Street Lighting:

The responsibility for street lighting was assumed by the Public Utilities Commission in February 1932. The budget for the year was $865,000, but the rate of expenditure was such that the Commission faced a possible deficit of $26,000 as of June 30, 1932. They immediately took steps to curtail lighting where possible without seriously affecting any locality, thus making it possible to close the year within the $865,000 budget appropriation.

At this time there were approximately 19,500 street lamps in service. The budget for the year 1932-33 carried an appropriation of but $850,000 for street lighting, which was insufficient to relight all lamps as there had been in service a greater number of lamps than could be lighted with the larger appropriation of the preceding year.

The expense of supervising street lighting had always been appropriated separately and in addition to the cost of the lighting. The commission has had to assume the cost of administering the department out of the lighting appropriation which further reduced the amount available for the purchase of service.

Early in January 1933 the Controller foresaw the necessity for curtailing expenditures of all departments to keep within funds available. The expenditures for street lighting were ordered reduced by 10 per cent for the year which was equivalent to a 20 per cent reduction during the last six months of the year. Altogether it was necessary to extinguish about 4,000 lamps throughout the City. It was also necessary to reduce the candle power of the remaining lights so that with few exceptions 400 candlepower is now the maximum. The following tabulation gives the expenditures for street lighting for the fiscal year 1932-33.

TABLE I

STREET LIGHTING EXPENDITURES

Fiscal Year Ending June 30, 1933

CONTRACTUAL SERVICES		
Gross charges as per contract with Pacific Gas and Electric Co.		$778,908.66
Less: Market Street Railway portion	$12,576.00	
Deduction account outages	4,042.94	16,618.94
Net		$762,289.72
PERSONAL SERVICES		10,535.51
NON-PERSONAL SERVICES		
Auto Expense	$ 295.20	
Carfare and Telephone	37.30	
Office Equipment and Supplies	729.80	1,062.30
COST OF REPLACING AND REPAIRING DAMAGED EQUIPMENT		
Gross	$ 748.85	
Credits	104.73	644.12
TOTAL EXPENDITURES		$774,531.65

The monthly expenditures are shown below. Beginning with January, the effect of the economy program is evident. The actual average daily expenditure was $2,122. The annual cost per capita is less than $1.25 which is relatively low compared with cities of similar population.

TABLE II

STREET LIGHTING EXPENDITURES BY MONTHS

Fiscal Year 1932-33

	SERVICES				
Months	Contractual	Personal	Non-Personal	Net Replacements	Total
July	$ 70,583.26	$ 850.22	$ 31.36	$..........	$ 71,464.84
August	69,964.78	861.46	24.75	Cr. 22.13	70,828.86
September	67,589.46	782.89	20.80	....	68,393.15
October	69,896.93	799.04	53.70	....	70,749.67
November	67,616.03	764.58	25.55	....	68,406.16
December	69,846.66	893.09	35.14	....	70,774.89
January	65,351.70	990.75	67.98	....	66,410.43
February	52,452.42	962.93	37.37	187.03	53,639.75
March	57,834.27	933.29	35.61	....	58,803.17
April	56,340.11	780.53	39.02	209.97	57,369.63
May	58,332.43	992.58	92.22	....	59,417.23
June	56,481.67	924.15	598.80	269.25	58,273,87
TOTALS	$762,289.72	$10,535.51	$1,062.30	$ 644.12	$774,531.65

The budget request of the Public Utilities Commission for street lighting for 1933-34 was $830,000. The appropriation was reduced to $780,000 before final approval of the budget and later on instruction from the Controller, the rate of expenditure has been cut so as not to exceed $710,000 during the year; thus on July 1, 1933, less than 17,000 street lights are in service.

The street lighting of the City is all supplied under contract with the Pacific Gas and Electric Company, the local light and power company, who owns almost all of the lighting facilities; the exception to this is largely through the installation of lamps by the City in connection with the boulevards, or by property owners in opening up new tracts.

The Public Utilities Commission annually takes bids for furnishing lighting service. The last two bids submitted by the Pacific Gas and Electric Company have contained rate reductions which have resulted in material savings to the City, those for 1932-33 amounting to over $25,000 and for 1933-34, it is expected that the saving will be $12,500.

The decrease in lighting necessitated by economic reasons has resulted in many complaints. Every part of the City was affected. As far as possible, the lighting in the residential districts was kept intact but the downtown area suffered very materially.

In addition to requests for reestablishment of lights extinguished, requests for additional lighting come in constantly. In most cases it has been absolutely necessary to refuse the request, notwithstanding the fact that the department is aware that many streets are now inadequately lighted. The next budget should carry an appropriation large enough to take care of at least the more urgent of these needs.

Careful attention is being given to securing continuity of service and collecting the contract penalty for all lamps out of service. Valuable assistance is being rendered in this work by the Police Department. A form has been worked up and distributed in sets to the various district stations. On these the reports of patrolmen are forwarded to the Department with a copy to the Pacific Gas and Electric Company, thus avoiding delay in getting lamps relighted.

The City has no complete record of the street lights. Maps and record cards have been prepared and partial time of three people is being employed in preparing comprehensive records on which each lamp is entered on a card and on a large scale fourteen section map. The detail given on the card shows not only the location and size of the lamp and equipment, but also the ownership and date of original installation. This card record will be invaluable in making adjustments on account of outage. The maps show graphically the distribution of lighting and will make intelligent readjustment possible in a number of locations.

Entirely new and comprehensive specifications covering the furnishing of street lighting, gas, and electric service on an annual basis has been prepared and contracts awarded for the years 1932-33 and 1933-34. The Pacific Gas and Electric Company has been the only bidder on these specifications as they are the only firm in a position to supply this service. As already pointed out above, the company has made appreciable reductions in their charges during these two years.

During the year 1931-32 complete new schedules covering the hours during which lamps are to be lighted were drawn up and placed in effect. These schedules have secured for the City 107 extra hours of lighting during the year without additional cost. The time of lighting and extinguishing lamps is regulated by the time of sunset and sunrise with due consideration to the season. The new schedule materially improves conditions during the early evening hours in the winter, and early morning hours throughout the year.

With the increasing number of City owned street lighting standards comes the problem of replacing those damaged or destroyed in automobile collision. With the co-operation of the Police Department, the City Attorney, and the Pacific Gas and Electric Company, every possible effort is being made to collect from those responsible for the accident, the actual cost of the damage. Money so collected is deposited with the City Treasurer to the credit of the Street Lighting Appropriation.

Building Lighting:

The City buys electric and gas service through 800 electric and 300 gas meters. Checking of these 1100 accounts is a considerable task as bills are rendered monthly. Prior to the establishment of the Public Utilities Commission there was no adequate single record made of these bills. Now a complete ledger system is in operation. This permits of supervising usage and the checking of rates applied so as to secure the service at least possible cost through the employment of the most favorable rate available.

During the past year a number of the large accounts have been surveyed in the field resulting in recommendations being made to the department interested as to desirable changes in connections and usage. If the recommendations which have already been made are carried out by the departments, the annual saving will be close to $9,000. The making of these surveys is a long and tedious job as it involves visiting each point of use and the thorough investigation of the system through which the electricity and gas is distributed on the property. During the year new rates for natural gas employed in heating and power installations were placed in effect on all of the larger installations where the rates would prove economical.

Miscellaneous Work:

On account of its technical character, the Power and Lighting Department has been called in to assist various other branches of the government in electrical matters.

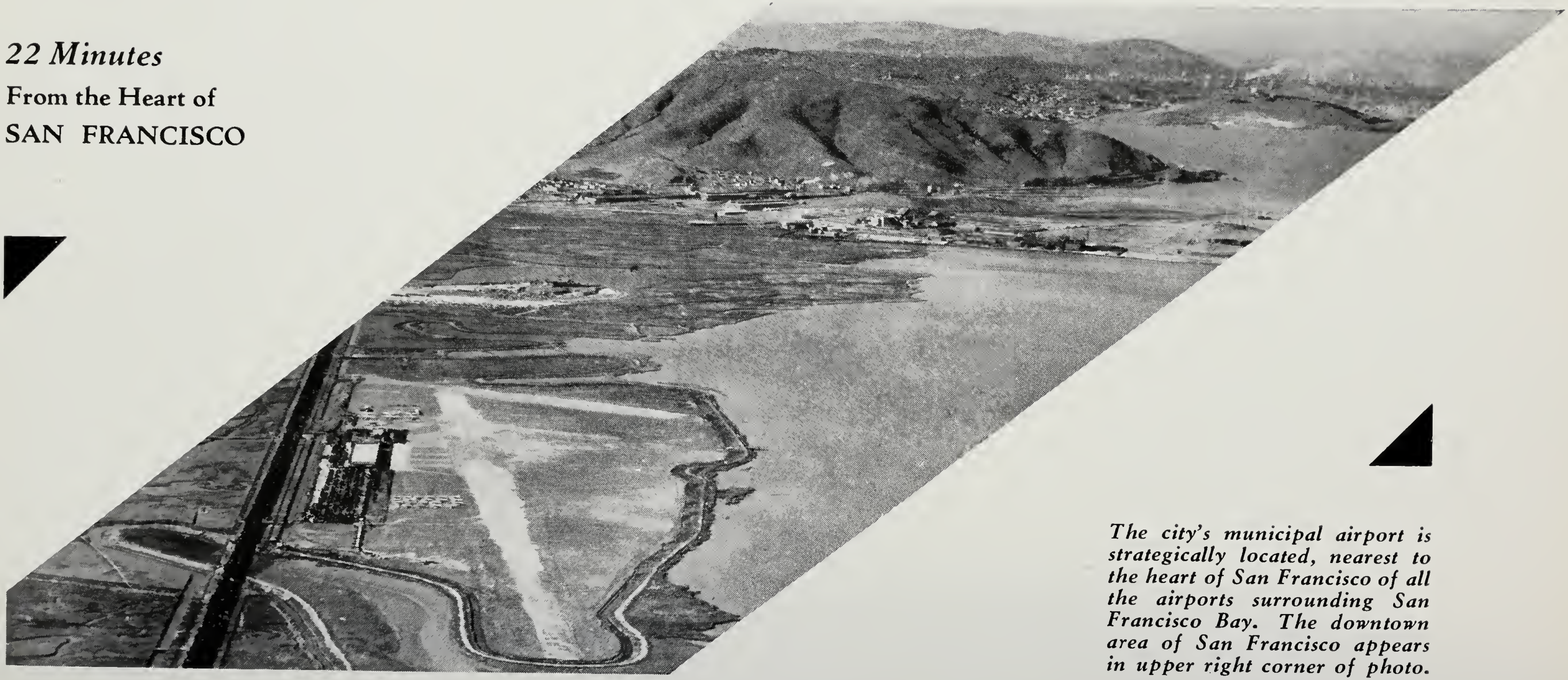
Assistance has been rendered to the City Engineer in the construction of lighting systems on the Esplanade, Sloat Boulevard, Bay Shore Boulevard, Alemany Boulevard, Sunset Boulevard and Market Street Extension. Estimates and reports involving street lighting and street railway rearrangement have been furnished to the City Engineer for a number of proposed projects. During the past fiscal year the drawbridge over the channel at Third Street was completed and placed in operation. This Department assisted the City Engineer by assuming the responsibility for the electrical portion of the installation.

The Municipal Railway has been assisted in the preparation of engineering data incident to the operation of the railway. Regular tests are also made of the meters through which power is purchased for the operation of the cars.

Technical assistance has been rendered to the Airport in connection with their lighting, power and telephone service.

The San Francisco Water Department has also been assisted by making electrolysis surveys resulting in recommendations for electrical drainage and insulation.

22 Minutes
From the Heart of
SAN FRANCISCO



The city's municipal airport is strategically located, nearest to the heart of San Francisco of all the airports surrounding San Francisco Bay. The downtown area of San Francisco appears in upper right corner of photo.

SAN FRANCISCO AIRPORT

Fiscal Year Ended June 30, 1932
and
Fiscal Year Ended June 30, 1933

FISCAL YEAR 1931-32:

The fiscal year ending June 30, 1932, began with the control and operation of the Airport vested in the Airport Committee of the Board of Supervisors, consisting of Hon. E. J. Spaulding (chairman), Hon. Carl Miles and Hon. Jefferson E. Peyser. On January 8, 1932, the Airport under the new charter became a department of the Public Utilities Commission.

During the period July 1, 1931, to January 8, 1932, routine maintenance work was done on landing area and structures; yearly levee maintenance was initiated; and certain improvements and alterations of hangars and equipment, which are more fully detailed in this report, were begun.

After January 8, 1932, when the control of the Airport was transferred to the Public Utilities Commission, the work initiated under the previous administration was carried on. At their direction, a thorough study was made of the Airport and the problems involved in its operation, which when completed was made the subject of a report. The report showed the Airport to be in excellent physical condition, landing area being usable in all weather, and hangars, buildings, and equipment having been properly maintained and adequate to handle the existing traffic and business.

The report has been compiled from records available, and is not as complete as it would have been had it been prepared by the management incumbent during the period the report covers.

Upon the assumption of duties by the present management, on July 1, 1932, the Airport, buildings, and equipment were found to be in excellent condition, and we wish to acknowledge our indebtedness to the previous administration for the manner in which many of the difficult problems confronting them were solved and the way pointed for the solution of many others.

Traffic:

While traffic figures for various periods are very sensitive to the weather, the amount of publicity the airport and operators are obtaining, and particularly to business conditions in general, they do reflect to a certain extent the health of the airport and how well it is fulfilling its function of serving the people of San Francisco.

Total traffic for the fiscal year 1931-1932, due chiefly to the advent and operations of Century Pacific Lines, Ltd., shows a decided increase over the preceding period, when no regular transport line was using the port. While other classes of traffic, charter, student instruction, short passenger flights, pleasure flights, etc., shows a decrease, the falling-off is not unfavorable in the light of the decline in general business conditions and of the stormy month of December, 1931, when traffic was at its lowest point since the establishment of the port.

Detailed monthly traffic figures for the year follow, and are compared with the total figures for the preceding year, during which time no detailed figures were kept. Total traffic for the fiscal year 1931-1932 show an increase of 35% in passengers carried and of 25% in flights from the port over 1930-1931.

SAN FRANCISCO AIRPORT TRAFFIC

July 1931 to December 31, Inclusive

(Figures in parentheses are for 1930)

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Half Year
Transport Arrivals	153	215	326	348	271	183	1496
Passengers	755	1126	1276	1338	927	453	5875
Transport Departures	150	217	326	351	277	192	1513
Passengers	565	1024	1334	1279	913	517	5632
Transient Arrivals	215	262	238	216	207	123	1262
Passengers	258	375	264	280	226	121	1524
Transient Departures	220	268	234	219	198	117	1256
Passengers	248	344	235	264	223	120	1434
Sightseeing and Short Flights	125	157	178	88	91	15	654
Passengers	254	268	344	176	194	31	1267
Other Fixed Base Takeoffs	928	1141	1057	960	841	313	5240
Total Passengers	2654	3969	4066	3876	2921	1411	18897
	(2432)	(1975)	(1359)	(1584)	(1983)	(1680)	(11013)
Total Flights	1812	2258	2298	2172	1881	939	11360
	(1451)	(1608)	(1270)	(1265)	(1293)	(1218)	(8102)

January 1932 to June 1932, Inclusive

(Figures in parentheses are for 1931)

	Jan.	Feb.	Mar.	Apr.	May	June	Year
Transport Arrivals	214	135	230	197	41	30	2343
Passengers	590	282	554	478	56	35	7870
Transport Departures	222	136	233	190	42	30	2366
Passengers	713	307	524	463	66	29	7734
Transient Arrivals	174	127	207	209	216	250	2445
Passengers	153	110	146	178	202	209	2524
Transient Departures	175	124	200	221	224	251	2451
Passengers	148	87	115	167	211	218	2380
Sightseeing and Short Flights	53	89	113	43	87	42	1081
Passengers	101	157	198	79	151	80	2033
Other Fixed Base Takeoffs	726	704	917	768	870	730	9955
Total passengers	2044	1342	2174	1905	1306	1018	28686
	(2119)	(1696)	(1970)	(1545)	(1480)	(1419)	(21242)
Total Flights	1549	1314	1895	1614	1460	1327	20519
	(1349)	(1144)	(1539)	(1415)	(1436)	(1377)	(16362)

Transport:

Marking the success of an intensive educational campaign by the Airport Committee of the Board of Supervisors featured by a renewal of interest on the part of civic bodies and organizations in the airport, Century Pacific Lines, Ltd., a subsidiary of the Cord Corporation, chose San Francisco airport for their operating base in inaugurating their new coastwise service.

As the result, the port was again with transport service on July 6, 1931, for the first time since the ceasing of operations by Continental Air Express in July 1930. At the peak of their activity Century Pacific operated eight round trip schedules per day between San Francisco and Los Angeles and four between San Francisco and Sacramento. In the early part of 1932, the Cord Corporation sold its aviation interests to the Aviation Corporation, whose operating subsidiary, American Airways, continued Century Pacific until May 5, when the coastal service was discontinued. However, in the nine months of their operation Century Pacific had flown more than 15,400 passengers in and out of San Francisco airport, and the greater convenience of this port for passengers, approximately 70% of their Bay Region traffic passing through this field, and the superior weather conditions on this side of the bay had been established.

On April 17, Coast Airways, Ltd., basing in Santa Barbara, began a service between San Francisco and Los Angeles, via Santa Maria and Santa Barbara with San Francisco airport as their northern terminus. This line operated three-passenger cabin ships on two round trips per day, and during the two and a half months ending June 30, 1932, carried approximately 150 passengers in and out of the port.

Transient:

While no separate figures are available for the fiscal year 1930-1931, it is probable that, in accord with the general lessening in aviation activity, transient traffic decreased in 1931-1932. Hangar ship-nights assignable to transients decreased from approximately 520 in 1930-1931 to about 460 in 1931-1932.

Sightseeing and Short Paid Passenger Flights:

Here again no separate figures are to be had for 1930-1931, but it is probable that this type of traffic decreased. The time is past when large numbers of people want to fly out of curiosity and for a thrill.

Other Fixed-Base Flights:

Under this category are included pleasure and student instruction flights. It is felt that this type of traffic has held up, it having been stated by good authority that more students are obtaining private pilot licenses from this port than from any other field in the Bay Region. In June 1932 seven operators were active at the port in giving flight instruction.

Accidents:

Maintaining a remarkable safety record, no aircraft accidents involving fatal or serious injuries to persons occurred at the airport during the fiscal year, and but one accident involving minor injuries.

Weather:

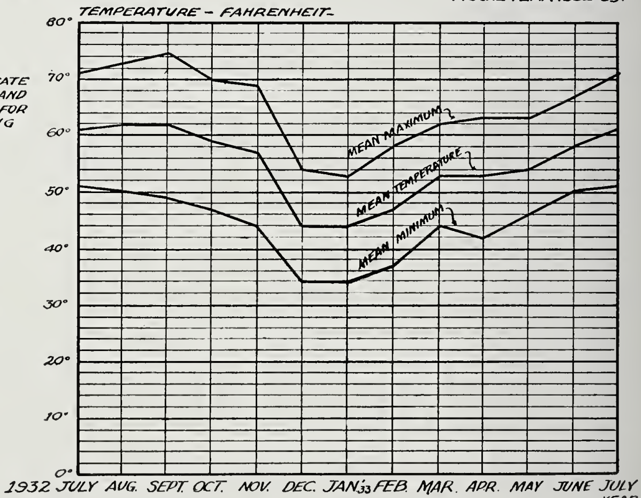
For purposes of comparative weather study, the year is divided into two seasons: winter, covering the months October to March, inclusive; the rainy season, when the weather is much the same over large areas, and which in the Bay Region has better flying weather than—summer, which covers the months April to September, inclusive, which is featured principally by localized ocean fogs, and when an intelligible comparison between ports may be made.

The following discussion, therefore, covers the two seasons ending in the fiscal year 1931-1932; namely, summer, April 1931 to September 1931, and winter, October 1931 to March 1932.

Summer 1931 was not exceptional in any way from the corresponding seasons during which observations have been taken at this site. Wind roses and ceiling height charts for the period follow, ceilings at San Francisco

SAN FRANCISCO AIRPORT WEATHER

FISCAL YEAR 1932-'33.



FIGURES BELOW INDICATE ABSOLUTE MAXIMUM AND ABSOLUTE MINIMUM FOR EACH MONTH DURING YEAR.

MONTH	MAX.	MIN.
JULY	84°	47°
AUG.	87°	44°
SEPT	100°	44°
OCT.	80°	35°
NOV.	84°	34°
DEC.	67°	20°
JAN.	66°	27°
FEB.	66°	29°
MAR.	72°	36°
APR.	82°	32°
MAY	87°	41°
JUNE	75°	42°

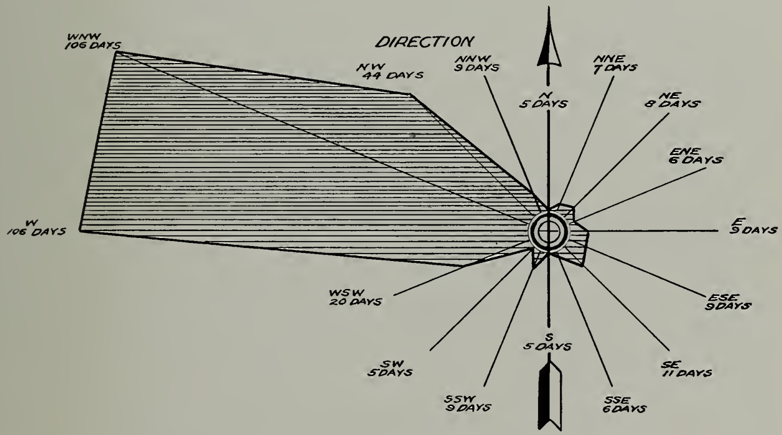
		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	YEAR
RAINFALL	NO. DAYS WITH .01 OR MORE	1	0	0	1	5	11	16	6	10	3	7	1	61
	AMOUNT FOR MONTH	0.01	T.	T.	0.02	0.62	3.04	6.37	0.75	2.55	0.10	1.04	0.01	14.51
	GREATEST IN 24 HOURS	.01	T.	T.	0.02	0.32	0.91	0.92	0.47	0.84	0.05	0.49	0.01	.92
SKY CONDITIONS	NO. DAYS CLEAR	23	28	27	18	16	13	12	16	10	13	14	15	205
	NO. DAYS PARTLY CLOUDY	6	2	3	10	8	11	9	10	12	13	9	10	103
	NO. DAYS CLOUDY	2	1	0	3	6	7	10	2	9	4	8	5	57

airport being compared with those in the East Bay, and showing an advantage for this port, as in the past. No visibility chart was made for this period for the reason that the hours of restricted visibility were too few at each port, e. g., San Francisco airport had but four hours when visibility was less than one-fifth of a mile.

Winter 1931-1932 was not exceptional save during the latter part of December, when extraordinary rainfalls were recorded. Rainfall during December amounted to 11.17 inches, more than the season total for 1930-1931, when 11.12 inches were recorded. A twenty-four hour rainfall of 2.37 inches was measured on the morning of December 27, and during the eight-day period from December 21 to December 28, inclusive, the precipitation was 8.30 inches. The December rains provided a severe field test which few ports in the state were able to stand, but despite the exceptionally heavy downpours at San Francisco airport the drainage system functioned excellently and the turf and runways were at all times firm and fit for the landing of transport planes. Wind roses and ceiling and visibility charts for the period follow, and are very similar to those for the preceding seasons since the time when observations were begun.

SAN FRANCISCO AIRPORT WIND

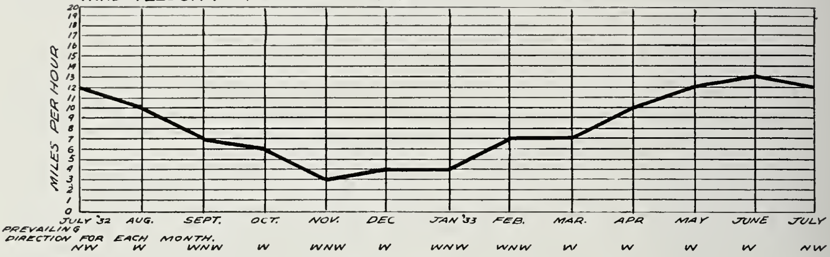
NUMBER OF DAYS PREVAILING WIND BLEW FROM EACH DIRECTION—FISCAL YEAR 1932-'33



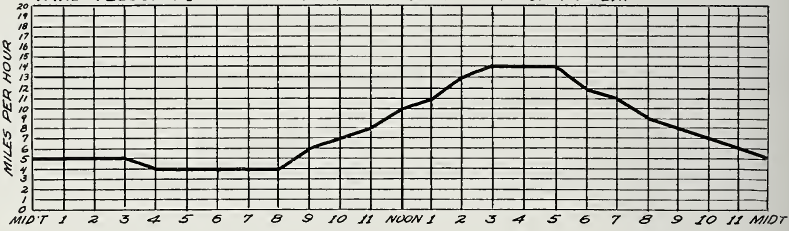
SAN FRANCISCO AIRPORT

WINDS
FISCAL YEAR
1932 – 1933

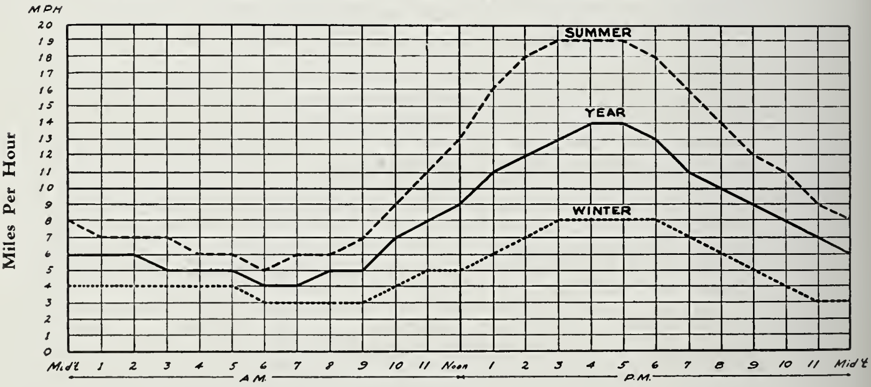
WIND VELOCITY— AVERAGE VELOCITY FOR EACH MONTH OF THE YEAR



WIND VELOCITY. AVERAGE VELOCITY FOR EACH HOUR OF THE DAY



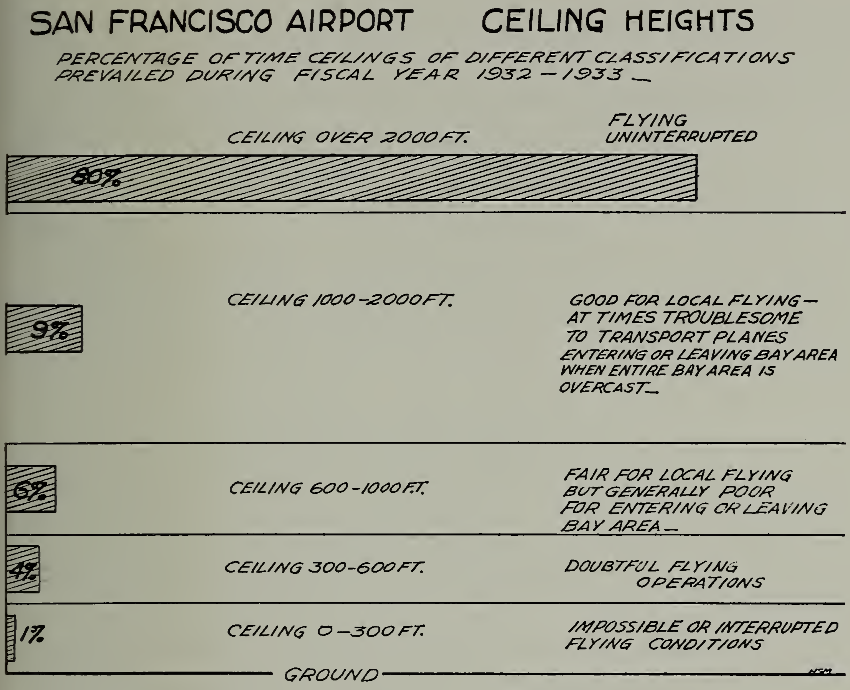
WIND—AVERAGE HOURLY VELOCITY—THREE-YEAR RECORD



AVERAGE HOURLY VELOCITY

Summer	11 miles per hour
Winter	5 miles per hour
Year	8 miles per hour

Winter—October-March (inclusive).
Summer—April-September (inclusive).



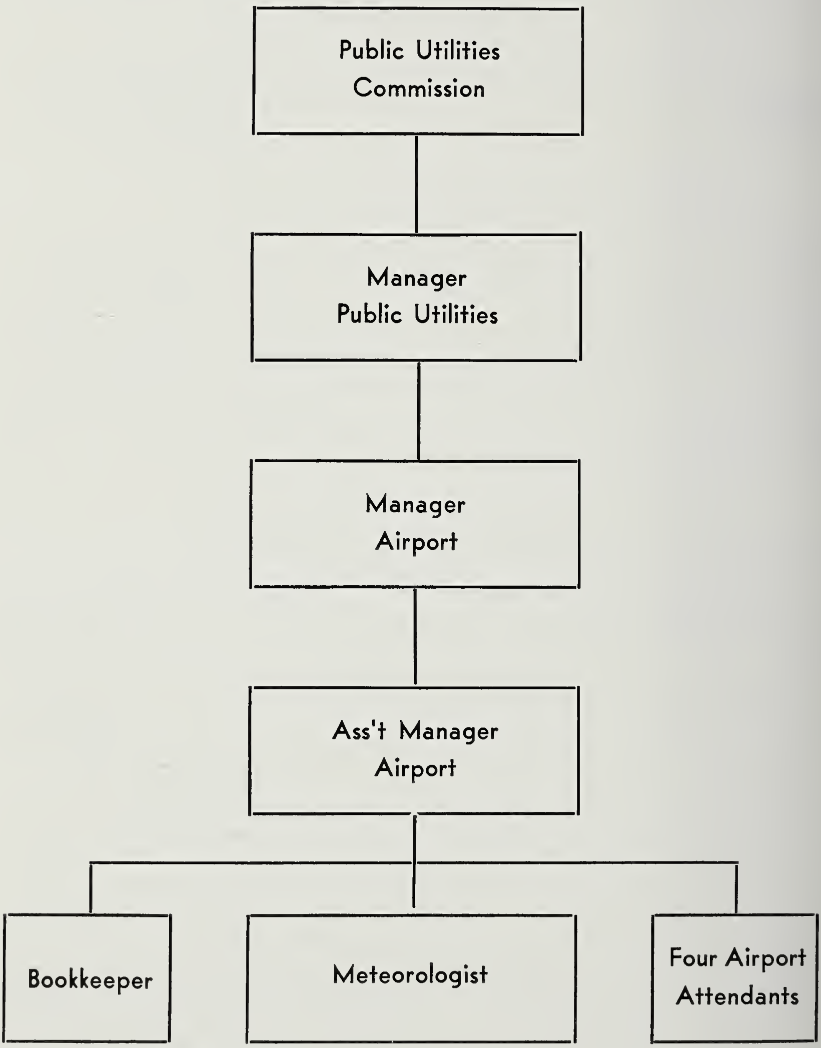
Improvements and Additions to Equipment:

In addition to regular maintenance, the budget allowed certain permanent improvements during the fiscal year 1931-1932. Of these, the principal were: alteration of Hangar No. 1, construction of stockroom, shops, and quarters, so as to make this hangar suitable for airline tenancy; alteration and enlargement of Administration Building to provide for airline operations and ticket offices; improvement of the area east of the Administration Building and installation of canopies for handling air transport passengers; construction of fire walls between Hangar No. 2 and Hangar No. 3 and between Hangar No. 3 and Hangar No. 4; removal of old shops and offices in backs of hangars and construction of office and lecture rooms in shops of Hangar No. 2 annex; repair and enlargement of asphalt and concrete aprons in front of hangars, and of automobile parking area between hangars and the Bayshore Highway; addition to height of the levee and dredging of channel to the boathouse so as to permit crash boat to be used at all times; addition of green auxiliary beacon to airway beacon; rearrangement of external lighting of buildings to reduce power consumption; and purchase of a suitable crash boat.

Several important improvement projects which were not permitted by the budget are: construction of a repair shop and "dope" room, which could

S. F. AIRPORT PERSONNEL ORGANIZATION CHART

June 30, 1933



be profitably leased; widening and grading of the highway entrance to the airport, and construction of a waiting station at this point for 'bus passengers; construction of a six-inch water line from the San Bruno mains, to provide fire protection; and installation of an airport radio station. It is hoped these improvements may be made in the near future.

Financial:

Due to the continued low level of general business and to the cessation of operations by Century Pacific, receipts by the airport did not reach the figure anticipated when the budget was prepared.

Detailed figures follow:

CONDENSED BALANCE SHEET

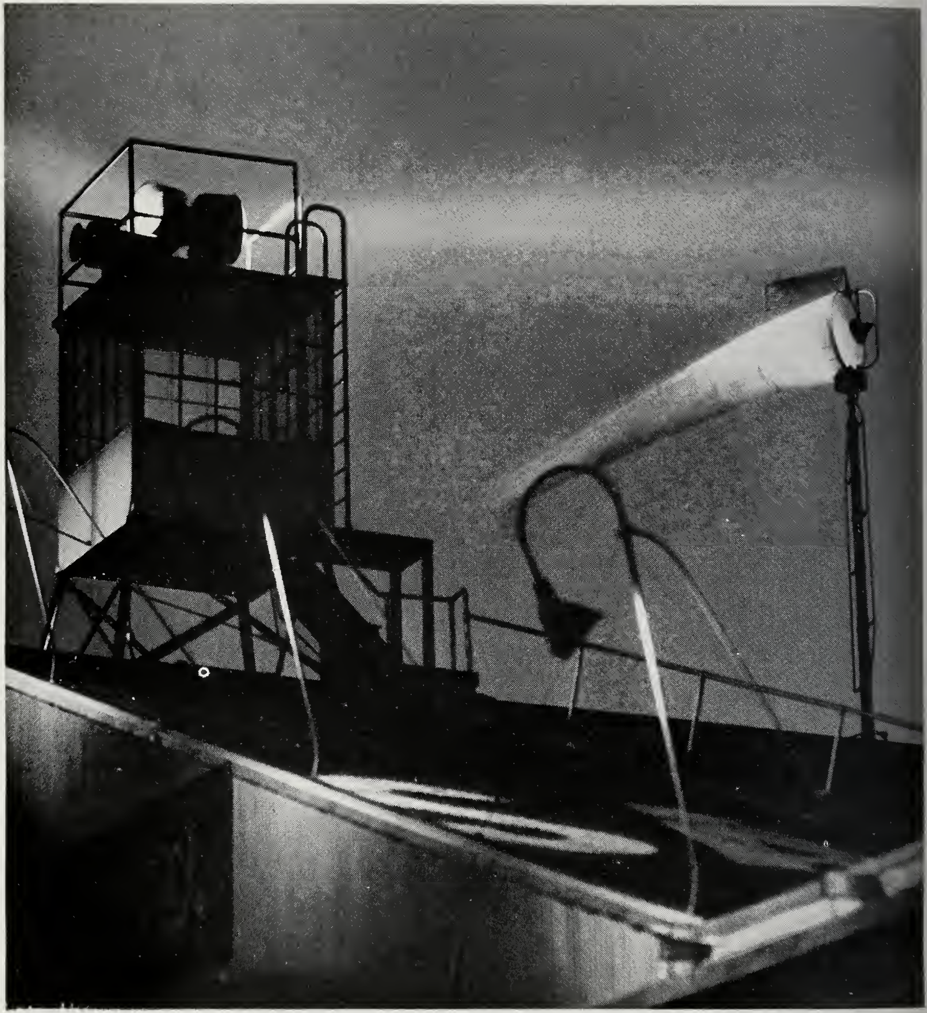
Fiscal Year 1931-1932

ASSETS—	June 30, 1932
Lands	$210,000.00
Plant and Equipment	460,420.19
Total Fixed Capital	$670,420.19
Accounts Receivable	5,460.17
Superintendent's Revolving Fund	200.00
Total Assets and Other Debits	$676,080.36
LIABILITIES—	
Allocation from Taxes to 6/30/32	$899,786.00
Less Deficit to 6/30/32	223,705.64
Total Deficit to 6/30/32	$223,705.64
Total	$676,080.36

Note:—No provision made for depreciation of plant or equipment.

Personnel:

Under the administration of the Public Utilities Commission a number of the employees were relieved from duty, and B. M. Doolin was appointed manager of the airport, with A. R. Wilde as his assistant. The total number of employees was reduced temporarily from seventeen to eight, and salary readjustments made so that the regular monthly payroll was reduced from $3,057.32 to $1,375.00.



NIGHT BEACON ATOP HANGAR NO. 1

The illuminated wind cone or "sox" informs the night-flying pilot of the wind direction and proper landing direction.

FISCAL YEAR 1932-33

The fiscal year 1932-1933 began with the control and the responsibilities of the operation of the San Francisco airport, vested in the Public Utilities Commission and under the managership of B. M. Doolin, whose appointment became effective June 1, 1932. The thirty days of June, therefore, were given over to an intensive study of the airport proper, its physical conditions, its general operating set-up, and a thorough survey of its problems and possibilities.

Both the Public Utilities Commission and the management of the airport were entirely confident and had complete faith in the future of the San Francisco airport and the only question in mind was how could the natural advantages of the airport and its location be best brought to the attention of the flying public and the citizens of San Francisco who had obligated themselves to purchase the land on which the airport was situated and to support it.

The management, of course, realized that the largest single agency responsible for the present development of air service in the United States was the network of air transport companies carrying mail, passengers and express throughout all the cities of the United States, flying some 30,000 miles every twenty-four hours, day and night, but by whom the city of San Francisco had been ignored insofar as their services were concerned, as all the transport lines operating in and out of San Francisco Bay Region were landing their scheduled runs at the East Bay fields, necessitating an hour's trip by the citizens of our city by 'bus and boat before enplaning for transportation to other cities in the United States; air mail was similarly delayed in its dispatch from the city.

It was therefore determined that the first move would be to "sell" the air transport companies on the advantages of using San Francisco airport as a terminal better adapted to serve San Francisco and the peninsula towns adjoining, than the East Bay fields. With this in mind, a careful check was made of the origin of the passenger, mail and express business that they were enjoying in the Bay Region. The results were as we had assumed, that over 70 percent of the air transport business in the Bay Region originated in the city and county of San Francisco.

Direct steps were immediately taken by the management of the airport through personal contact to acquaint the executives of the various airlines of the results of the survey, the possibility of obtaining more business by serving the city of San Francisco directly through its own airport, and the saving in time with consequent decrease in operating costs to the companies that they would effect by using San Francisco airport as a terminal for air mail and passenger runs.

The result of these sales campaigns are set forth in chronological order in the following report. We wish here to give full recognition and express our appreciation of the whole-hearted support and co-operation of the manager of utilities, Mr. E. G. Cahill; the San Francisco Junior Chamber of Commerce and its affiliated Senior Chamber; the peninsula newspapers and the large metropolitan dailies of the city of San Francisco, for their support of the airport and its management and their faith in its future.

Traffic:

Traffic in and out of San Francisco airport at the beginning of the fiscal year was at its lowest level in the history of the field. With the single exception of Coast Airways, Ltd., no transport lines were using the field and the operation of Coast Airways was more or less sporadic. It was obvious that this line could not long continue to operate under the continuous loss it was suffering. The charter business on the field was practically non-existent, flight instruction being given by two or three small schools had dwindled to a point where most of the school operators were seriously considering closing their schools entirely. Transient and itinerant pilots seldom used the airport as most of the major companies and schools were operating out of the East Bay fields and naturally pilots arriving in the Bay Region, particularly from out-of-state cities, used the fields that were better known. General business conditions and the depression, of course, had a great deal to do with this stagnant condition of the aircraft industry, which was felt throughout the United States by it as well as all other business activities. The lack of transport aircraft operation in and out of San Francisco airport in contrast to the activities of the East Bay fields naturally had a depressing effect on all activity at our airport.

Due to the necessity of reducing the payroll at San Francisco airport, under these conditions, the personnel was reduced from eighteen to eight persons, and with this reduced force it was necessary to eliminate the recording system whereby the arrival and departure of every aircraft, regardless of whether it was student flight or transient pilot, was religiously kept. As a matter of fact, the traffic was so low that it was useless to record it and therefore in our following tables of traffic we have disregarded the period from July 1, 1932, until December of the same year.

The first victory in our sales campaign was won in the latter part of August of 1932 when we were successful in moving the operating base and headquarters of Valley Airlines from an East Bay port to San Francisco airport.

Valley Airlines operated two single-motored monoplanes between San Francisco, Stockton and Sacramento, running three schedules daily in each direction and transporting newspapers and passengers between these three cities. This organization could hardly be called a major airline. It was, however, our first step toward recognition by the operators of the fact that San Francisco airport provided a more accessible port to operate from, particularly for short range flights such as these, than any of the East Bay fields.

The second organization to transfer its Bay Region terminus from the East Bay to San Francisco airport was Cardiff & Peacock Airlines of Bakersfield, California. This organization had been operating in the Valley towns as a school and charter flight service and had lately opened an airline connecting the Valley towns with San Francisco by means of an East Bay field. It had four single-engined monoplanes in service and shortly after coming to San Francisco airport extended service to provide two or more daily schedules between San Francisco, Modesto, Fresno, Bakersfield and Los Angeles. This line also carried passengers, newspapers and a gradually increasing amount of air express between the above cities and San Francisco. As was the case with Valley Airlines, Cardiff & Peacock immediately began to feel the beneficial effect of transferring operations to this airport in that passenger and express business began to show a slow but steady increase in volume.

The acquisition of these two airlines and the clock-like regularity of the arrivals and departures of their schedules at San Francisco airport brought renewed interest in the field and renewed hope to the transient and school operators, who had kept faith in San Francisco airport and carried on during the lean months. School enrollments showed a slow increase and pleasure and charter flying began to pick up.

December of 1932 brought our first major victory, a victory which marked what might rightfully be called a "new era" for San Francisco airport. On the twenty-seventh of that month after a short trial period to allow their pilots to become familiar with the field, Pacific Air Transport division of the United Airlines inaugurated its first regularly scheduled stop at San Francisco airport of its coastwise, Seattle to San Diego, air mail and passenger line. Thus, for the first time in the history of the air mail, the city of San Francisco was provided with direct air mail and passenger service with neighboring coast cities through her own airport. This event was doubly significant in view of the fact that Pacific Air Transport was one of the real pioneers in government air mail transportation, it having operated and pioneered passenger and air mail transportation on the Pacific Coast, later becoming a unit of one of the world's greatest air transportation systems.

This event was closely followed by one of equal if not greater importance on February 1 of 1933. On that date, Transcontinental & Western Air, Inc., announced to the public that it would at once extend its line, operating from Los Angeles to the East Bay, to the San Francisco airport.

Transcontinental & Western Air, Inc., better known perhaps as the Lindbergh Line, was also one of the pioneers in air mail and passenger operations throughout the United States and was originally known as T. A. T. Maddux Line, operating in conjunction with the Pennsylvania Railroad to provide transcontinental air service from New York City to Los Angeles. After reorganization under the name of Transcontinental & Western Air, Inc., it extended passenger runs from Los Angeles to Oakland airport. Extension of this line to San Francisco airport provided for the first time a direct service from San Francisco for passengers and air express, via Los Angeles, Albuquerque, Amarillo and Kansas City to New York City. It did not however provide air mail service over this entire route as T. & W. A. did not hold an air mail contract between San Francisco and Los

Angeles. Its air mail contract run from New York City terminated at Los Angeles.

To provide this vital air mail service from San Francisco to New York City and particularly through the Middle Western cities, the management of the field, with the aid of Mr. E. G. Cahill, Manager of Utilities, and various civic organizations in San Francisco, finally secured for Transcontinental & Western Air, Inc., the extension of its air mail contract from Los Angeles to San Francisco; this, at last, providing the city of San Francisco with direct air mail service to the Middle Western cities and New York City. The occasion of the first Eastern air mail departure was an event of far-reaching importance to the citizens and business houses of our city, definitely placing San Francisco airport on the United States airways map. It was acclaimed by all civic organizations and the newspapers as the greatest forward step that had been accomplished at the field since its inception.

TRANSPORT PLANE ABOUT TO TAKE OFF AND HANGAR
Note beacon and illuminated wind cone.

So far all transport operations in and out of San Francisco airport had been during daylight hours, but as they continued uninterrupted by weather or field conditions on the airport, and as the volume of passenger business immediately showed a marked increase due and traceable directly to the results of the transfer of these lines' operations from the East Bay, Pacific Air Transport began operation of night mail through San Francisco airport in the spring of 1933, thus providing the business houses in San Francisco with a later closing hour for the dispatching of their day's mail to the north and south Pacific Coast cities.

In order to provide rapid ground transportation for the air lines' passengers from San Francisco airport to the city of San Francisco, the Airdrome Transport Company, which operates a fleet of large limousines, contracted with the airlines to provide this service. Test runs showed that regular schedule could be maintained between downtown ticket offices of the airlines, the major hotels and the airport in twenty-five minutes' running time, a saving of nearly forty-five minutes over the previous arrangement whereby passengers were picked up in San Francisco by these limousines, taken on board a ferry boat and driven from the Oakland pierhead to the East Bay fields.

San Francisco airport had now thrown off its lethargy and was forging ahead with rapid strides to a position of major importance among the country's major air fields. Much favorable comment was heard on all sides regarding the rapid development of the field in the past few months. Industrial and business firms of San Francisco showed keen appreciation of the air transportation offered them at their door by an ever-increasing use of the air mail and express service offered by the field.

The close of the fiscal year was marked on June 1, 1933, by operation of the first schedule from San Francisco airport of the world's fastest air transportation system operating between Los Angeles, San Diego, San Francisco and Sacramento. Varney Speed Lines, the pioneer operator of super-speed passenger transportation, using single-motored Lockheed low-

NIGHT VIEW OF THE INTERIOR OF THE HANGARS wing monoplanes to transport passengers at 200 miles per hour, on that date also transferred their operations from the East Bay to San Francisco airport. This organization offered to the air traveler transportation from San Francisco to Los Angeles in the phenomenal time of one hour and fifty-eight minutes as against the normal running time of approximately three hours. Their bid for patronage against the competing lines covering the same territory was purely on a basis of speed, and it was only after careful observation on their part of the success of the operations of their competitors from San Francisco airport that they transferred their operations to this field. The successful operation of their super-speed airplanes off and on San Francisco airport also definitely and for all time quashed the hard-dying rumor that our city's airport was not suitable for use by these extremely high-speed types of aircraft.

The arrival and departure of these ships flashing through the sky at over 200 miles per hour every two hours during the day was one of the spectacles enjoyed by the many thousands of people that now visited the airport, particularly on week-ends, to share in the thrill of watching these great liners of the sky arriving and departing, debarking and embarking passengers, mail and express with clock-like regularity.

The close of the fiscal year and a review of the accomplishments of the preceding twelve months insofar as traffic was concerned, showed the task that the new management of the San Francisco airport, under the direction of the Public Utilities Commission, had set out to do, namely to make the San Francisco airport the major airport of the West, was well on its way to completion. In that period it had revived the interest of the city in its airport; had rejuvenated the school and charter trip business on the field proper and had developed transport operation and air mail service from zero to the point where scarcely an hour of the day or night passed that did not see the arrival or departure of an air mail and passenger airliner connecting San Francisco with all the major cities of the nation. Much was left to be accomplished in the new year to come and the management of the airport looked forward with confidence to the future as it looked back with satisfaction to the accomplishments of the past twelve months.

Traffic Other Than Transport:

As will be noted on the accompanying traffic tables, the figures for traffic other than transport are incomplete and have been estimated to a large degree. This apparent neglect of transient, charter and school traffic does not imply a lack of realization of its importance to the airport. However, before these activities could be developed it was necessary that the possibilities and activities of the field be brought forcibly to public attention and to the attention of the sport pilots and the prospective student owner. Therefore our efforts toward the development of the field for this fiscal year were directed mainly at the air transport lines with the realization that the acquisition of these lines for the airport and the publicity that would be gained by the field in the activity of the air mail and passenger ships would be the greatest factor in reviving the interest of the school operator and the sportsman pilot in the field.

The logic of this assumption was proven by nearly a 100% increase in the activities of the schools and the charter flight operators, as well as in the number of transient arrivals and departures at the airport during this fiscal year.

SAN FRANCISCO AIRPORT TRAFFIC

December 1, 1932 to July 1, 1933

	Dec.	Jan.	Feb.	March	April	May	June	Totals
Transport Arrivals	49	123	263	221	216	232	284	1388
Passengers	131	495	912	835	824	1020	1137	5354
Transport Departures	51	123	263	225	220	240	289	1411
Passengers	120	497	925	850	853	935	1128	5308
Transient Arrivals	79	57	85	71	71	110	91	564
Passengers	52	57	70	70	43	91	51	434
Transient Departures	79	58	74	75	71	110	95	562
Passengers	34	62	67	44	31	78	45	361
Sightseeing and Short Flights	7	34	61	10	17	13	50	192
Passengers	13	35	35	40	99	91	120	433
Other Fixed Base Takeoffs	1240	508	772	648	594	651	750	5163
Total Passengers	350	1146	1974	1839	1850	2215	2361	11735
Total Flights	1505	903	1518	1250	1189	1356	1559	9280

Accidents:

During the fiscal year the airport has carried on the high standard of safety flying operations that have characterized the field since its inception. There were no accidents involving death, serious or even minor injuries to any pilot or passenger of any aircraft operating from San Francisco airport. This perfect record has been maintained through careful supervision of all flying operations and close co-operation with the inspectors of the Aeronautics Branch of the Department of Commerce, who are charged with the periodic inspection of all aircraft. The management has seen to it that only those aircrafts duly examined and licensed by the Department of Commerce Aeronautics Branch have been allowed to operate at the airport, and that only men duly qualified as competent by the department have been permitted to operate them for the purpose specified by the Government.

It has been the policy of the management, and will continue to be the policy, that San Francisco airport shall be noted for careful and intelligent control of all flying operations on the field so that the citizens of the city may feel sure that any flight embarked upon from San Francisco airport will be conducted with the maximum of safety in properly maintained and inspected aircraft by thoroughly competent pilots.

In comparison, it might be here stated that during the fiscal year the personnel and management of the airport were called upon to transport to the South City Hospital, nearest adjacent the field, no less than twenty-six persons who had been seriously and in the case of four, fatally injured in automobile accidents on the Bayshore Highway in the immediate vicinity of the field. Also that the airport crash boat, maintained to render emergency service to any aircraft that may be disabled in flight and forced to alight on the waters of the bay adjacent the airport, was not called upon for service in this respect during the fiscal year, but was used on a number of occasions by the airport personnel to rescue the occupants of small boats that had become disabled or swamped, or to tow back to shore adventurous duck hunters who were unable to regain the shore in their small boats due to heavy weather. Several of these rescues were effected within a radius of about three miles of the field and a total of nine persons were brought to shore who would probably have otherwise perished had not the airport emergency boat been available.

Events:

In conjunction with the campaign to revive the interest of our citizens in the airport, an Air Show was held at the field on Sunday afternoon, November 20, 1932, which was preceded by a dance given by the pilots and operators of the field in one of the field hangars on Saturday, November 19. The dance was an unqualified success and the receipts derived therefrom were used, after paying the minor expenses of the dance, to provide prizes and to supply gas and oil for contestants in the Sunday afternoon events. The attendance at the Air Show on Sunday afternoon far exceeded expectations. It was estimated conservatively that 20,000 people viewed the events of the afternoon and were well repaid for their trip to the field. Through the courtesy and co-operation of Lt. Commander Connell of the United States Naval Reserve at Oakland, California, a flight of three airplanes of the Naval Reserve Unit, led by Lt. J. Hughes, gave a remarkable exhibition of formation acrobatic flying and military maneuvers. The Army was represented by a flight of seven modern pursuit planes from March Feld, California, that being on a crosscountry mission, were routed to San Francisco airport by Lt. Col. H. H. Arnold, Commandant of the field at the management's request.

Col. Roscoe Turner, flying his racing Wedell Williams airplane, arrived from Los Angeles in slightly over one hour and thirty minutes and put on a startling exhibition of high-speed flying in this 300-mile-per-hour aircraft. Local pilots from San Francisco airport and other fields in the Bay Region competed for prizes for races of low-powered airplanes, spot landing contests, and a bomb-dropping contest.

An exhibition of "dog fighting" or wartime military pursuit tactics was engaged in by Capt. B. M. Doolin, manager of the field, and Don Templeman, an ex-army pilot, both of them flying military aircraft and demonstrating how pursuit planes maneuvered to gain advantage in combat during the late war. There was also a "powder-puff" bombing contest engaged in by pilot members of the Ninety-Nine Club, an organization of women pilots having headquarters at the field, in which the girl pilots attempted to drop paper sacks of flour within the bullseye of a target drawn on the ground in the middle of the field. The show was a success and though no revenue was derived from it as no charge was made for admission to the field, it greatly stimulated the interest of our citizens in the activities of the field, permitting them a close view of the modern military and high-speed racing planes that took part in the events during the afternoon; also directly benefiting the operators of charter aircraft on the field by bringing to the attention of the public that airplanes were available at San Francisco airport for chartered transportation to any port in the United States, day or night, or for pleasure sightseeing trips in the Bay Region.

Personnel

At the opening of the fiscal year, July 1, 1932, the airport personnel consisted of eight persons; a manager, Mr. B. M. Doolin; an assistant manager, Mr. A. R. Wilde; an aircraft inspector, a bookkeeper, a meteorologist and three airport attendants. This was a reduction of nine persons on the airport payroll, the personnel of the preceding fiscal year consisting of seventeen employees, the reduction in force being recommended by the airport manager to the Public Utilities Commission on the basis that receipts and revenues were at such a low level due to the condition of the aircraft industry in general and the field in particular, the employment of more than eight persons at the airport was inequitable in comparison to the business being enjoyed. Thus the monthly payroll was reduced from $3,057.32 to $1,375.00.

The reduction of 50 percent of the previous working force naturally put a heavy burden of service on those retained. All of them, however, realized that the field was passing through a crisis and all would have to put a shoulder to the wheel if the field was to be pulled out of its depression. The whole force worked gladly without thought of hours put in and in close co-operation with the management to put through the recovery program.

Brief History of San Francisco Airport Weather Bureau:

Aviation, by the very nature of the work, implies close relationship with the earth's atmosphere. In perhaps no other line of industry does atmosphere behavior play so important a role as in this new-born industry of the air. No brief of arguments is necessary to convince even the layman of this fact. And certainly to the professional man of aviation, the experienced man, the influence of weather stands out with imposing importance. For the pilots' highway is the fenceless skies, which unfortunately is a highway of ceaseless change, made difficult at times by "atmospheric mudholes."

That the founders of San Francisco airport were conscious of the weather role in the future progress of aeronautic activity is evidenced by the fact that in laying plans for the establishment of the municipal airport one of their first considerations was the climatic characteristics of the sites in question. A meteorological survey of four proposed airport sites on the

Peninsula was conducted for a period of one year under the direction of Mr. E. E. Eklund of the United States Weather Bureau office in San Francisco, who was recommended for the work by the chief of the U. S. Weather Bureau in Washington, and given leave for a period of one year.

The survey was completed on June 30, 1928, and the findings, reported in detailed form, recommended that the permanent airport site be the present San Francisco airport.

With completion of the survey, aviation interests had already begun to use San Francisco airport as a base of operation. The need of "weather reports" from various points along the airways was well realized by operations managers of the airlines, and already the Daniel Guggenheim Fund for the Promotion of Aeronautics, first independently, but later in co-operation with the United States Weather Bureau, had begun the establishment of a "model airway" between San Francisco and Los Angeles. That San Francisco airport should be a part of that newly organized system was well understood. It was decided by the airport committee of the San Francisco Board of Supervisors that a "weather personnel" would be maintained at the field as a department of the city's airport. Mr. E. P. Sullivan, formerly of the U. S. Weather Bureau office in San Francisco, was put in charge of the airport weather office, in which capacity he has served since July 1928. He has been assisted by Mr. H. S. Messersmith, also a former employee of the San Francisco Weather Bureau office. The U. S. Department of Commerce installed and maintained a teletype in the weather office, which made San Francisco airport an important station on the "Model Airway."

In July 1929, with the completion of the Guggenheim Fund's participation in airways weather organization, a new and more complete teletype system was organized by the U. S. Department of Commerce. This development was a part of a national program that has expanded steadily over the United States since that time. San Francisco airport was made a part of that system and furnished with a teletype. This arrangement continues to the present time.

Transmission of Weather Reports Over Teletype:

The airport employees, who take and send weather observations at San Francisco airport, are listed as "Airways Observers" under the U. S. Weather Bureau, and are subject to the supervision of that organization. Principal among the duties of this weather personnel is the taking of two observations hourly, and transmitting them in regulation form and at specified times over the teletype. Each observation includes the following data: Condition of the sky, state of weather, restriction to visibility, height of "ceiling", visibility (in miles), wind direction and velocity, temperature, dew point, barometric reading, and field conditions, with any additional remarks that may more fully paint the weather picture for the pilot interested. This service continues through the entire twenty-four-hour period. The observations thus sent from San Francisco airport are received by all airway stations to the North, East and South.

Weather Information Received Over Teletype:

Information received over the San Francisco Airport teletype includes an hourly "weather sequence" (reports from specified stations along an airway) from the San Francisco-Seattle, San Francisco-Salt Lake City and San Francisco-San Diego routes. Every four hours additional reports are received from outlying airways and off-airway stations.

Forecasts for all airways, and general weather predictions over the far western states are received morning and evening from the San Francisco Forecast Center, and short-range airways forecasts are received every four hours from the U. S. Weather Bureau airway centers at the Oakland Airport, Portland, Salt Lake City and Los Angeles.

Reports of winds in the upper air are received four times daily from "pilot balloon" stations over the western states. This latter information enables the pilot to seek an altitude at which the winds are most favorable for his particular flight, thus saving the airlines much time and expense. This is a form of weather data of great value even when skies are clear.

Incidentally, San Francisco Airport, under a special agreement with the U. S. Weather Bureau, has been an authorized pilot balloon station ever since the airport project was inaugurated in 1927. The observation at this field is taken at 9:30 a.m. The course of the balloon is followed by the observer for thirty minutes, to a height of 18,000 feet. The telescopic instrument used is called a "theodolite." In appearance it resembles a surveyor's transit.

The upper air data thus determined, together with the latest weather sequences and airway forecasts, are entered by the weather personnel on the "clearance" form of each transport flight begun at San Francisco airport.

Teletype equipment now in use is of a tape-type model, a machine which prints the messages on ribbon tape. It is expected, however, that a more modern teletype will be installed in our office within the next few months. This machine will be a page-type printer over which weather reports will be received in symbol form, and over which weather maps will be printed. This is the most recent improvement in teletype weather work. The manner of map reception is as follows: At a specified time every four hours the observer will insert in the teletype a blank base map of the western states. By automatic, perforated-tape transmission from the teletype center at Oakland Airport, the current weather map will be printed on the form. At the present time at stations desiring the four-hourly map, the local observer is required to enter the data and complete the map by hand—a much longer process.

Teletype—Aid to Air Navigation:

Another advantage of the teletype, apart from its function in dispensing weather information, is the transmission of airplane movement messages. At the request of any pilot—transient or transport—a "PX" (position message) will be sent to any station or stations desired, informing them of the plane's departure, giving the route taken, the license number, pilot's name, and certain remarks concerning passenger, cargo, and connection information. Specified stations along the route will then watch for the craft, reporting it "over" or "arrived" as the case may be. This service is particularly valuable to planes not equipped with radio. Emergency messages of various kinds, promoting safety in the operation of all aircraft, private and transport, are likewise acceptable as teletype traffic.

Weather Reports Kept:

The keeping of necessary weather records is another duty of the weather personnel. Summaries are made at the end of each month including such data as wind direction and velocity, ceilings, visibility, state of weather, maximum, minimum and mean temperatures, dew points, rainfall, number of clear, partly cloudy or cloudy days.

For several years the airport has been a cooperative station of the San Francisco Weather Bureau, mailing a monthly summary of weather conditions to the Climatological Division of that office.

Local Weather During Fiscal Year—Summarized:

The attached sheets of weather data, summarized for the fiscal year 1932-33, are self explanatory. Graphs have been drawn, which will be readily interpreted by the layman, and figures have been tabulated for averages in wind direction and force, ceiling heights, temperatures, rainfall, and general sky conditions. (See pages 182 to 185.)

It may be remarked, however, that San Francisco airport is particularly favored in its geographical location, for the blanket of fog so frequently inundating the entire Pacific coast during the summer months is less prevalent along the Peninsula than over most sections of the metropolitan area of the Bay region. The reason lies in the fact that "protection" is provided by the coast range of hills to the west. The prevailing winds are from a westerly direction and are heated by compression on the leeward (eastern) slopes of the range, thus delaying the fog formation and bringing about an early dissipation once it has formed. The mixing process set up by the winds blowing over the range is another fog preventive.

The one troublesome atmospheric element at San Francisco airport has been one which could, and it is hoped soon will, be transformed into an advantage, namely: prevailing westerly winds. Today they are cross winds; with an extension of the east-west runway by "filling" the tide flats, these winds would be ideal aids to landings and take-offs. With this development the one atmospheric obstacle to smooth aircraft operations at San Francisco airport would be removed, and strange to say this one time "obstacle" would be recognized, for the reason stated above, as an actual advantage.

The Public Utilities Commission and airport management are diligently engaged in an endeavor to find a means of bringing about this improvement, which is indispensable to future progress in developing San Francisco airport as a base of transport activity.

Financial Report for the Fiscal Year 1932-33:

Attached hereto and forming a part of the financial report for the fiscal year 1932-33, is an itemized income statement comprising not only the fiscal year 1932-33 but also the fiscal year 1931-32 and a comparative state of increase and decrease of the various items between the fiscal year 1932-33 and 1931-32.

It is unnecessary to go through this report item by item as the two sheets entitled "Condensed Comparative Balance Sheet" and "Income Statement," are self explanatory. There are, however, several items well worthy of particular attention, the figures themselves providing ample testimony of the economies of operation that have been affected during the year just closed, the remarkable decrease in operating deficit, and the comparative slight decrease of cash receipts despite the fact that the opening of the fiscal year found the airport at perhaps its lowest level of business and operation in history.

The decrease in cash receipts of $1,576.14 as against the decrease in operating deficit of $25,940.74, we feel is adequate testimony of the efficiency of operation of the airport department during the fiscal year 1932-33.

In studying these figures and comparisons consideration should be given to the fact that financial results of the acquisition of the business of the transport airlines does not show up in this report, due to the fact that the major airlines had begun their regular operation of all their schedules into the airport only at practically the end of the fiscal year, and that the increase in passenger business had not as yet had any marked effect on the passenger head-tax receipts. In this connection it will be noted that during the fiscal year 1931-32, head-tax charges were not in force at the airport, and in 1932-33 the passenger tax receipts were $810.25.

Attention is also invited to the decrease of $15,899.03 in salaries, the decrease of $5,062.28 in contractoral expenses, the decrease of $3,308.68 formerly incurred in the compilation of expensive reports and data, and other items of expense which were materially reduced without in any way affecting the efficient twenty-four hour daily operation of the airport.

In summing up the events of the past year, we wish to here give full recognition and acknowledge our indebtedness to the various civic organizations in San Francisco who have shown their faith in the future of the airport and have devoted much time and energy in aiding and assisting the management toward the successful completion of the various ventures embarked on, looking to the betterment of the San Francisco airport.

We wish also to express our appreciation of the friendly and helpful interest in the airport and the aid given the management in the solution of its problems by the Honorable Mayor of San Francisco, Angelo J. Rossi; the Honorable Alfred J. Cleary, Chief Administrative Officer, whose helpful co-operation has done much to insure the successful results of this year's operations.

CONDENSED COMPARATIVE BALANCE SHEET

June 30, 1932 and June 30, 1933

Assets	June 30, 1933	June 30, 1932	Increase
Lands	$ 315,000.00	$210,000.00	$105,000.00
Plant and Equipment	466,398.49	460,420.19	5,978.30
Total Fixed Capital	$ 781,398.49	$670,420.19	$110,978.30
Cash	5,295.80		5,295.80
Accounts Receivable	6,440.95	5,460.17	980.78
Superintendent's Revolving Fund	200.00	200.00	
Total Assets and Other Debits	$ 793,335.24	$676,080.36	$117,254.88
Liabilities			
Allocation from Taxes to June 30, '32	$ 899,786.00	$899,786.00	$
Allocation from Taxes — Fiscal Year 1932-33	134,591.74		134,591.74
	$ 1,034,377.74	$899,786.00	$134,591.74
Less Deficit to June 30, 1932	224,111.64	223,705.64	406.00
Less Deficit Current Year	22,226.66		22,226.66
Total Deficit to June 30, 1932	$ 246,338.30	$223,705.64	$ 22,632.66
	$ 788,039.44	$676,080.36	$111,959.08
Miscellaneous Accounts Payable	5,295.80		5,295.80
	$ 793,335.24	$676,080.36	$117,254.88

Note: No provision made for depreciation of Plant or equipment.

INCOME STATEMENT

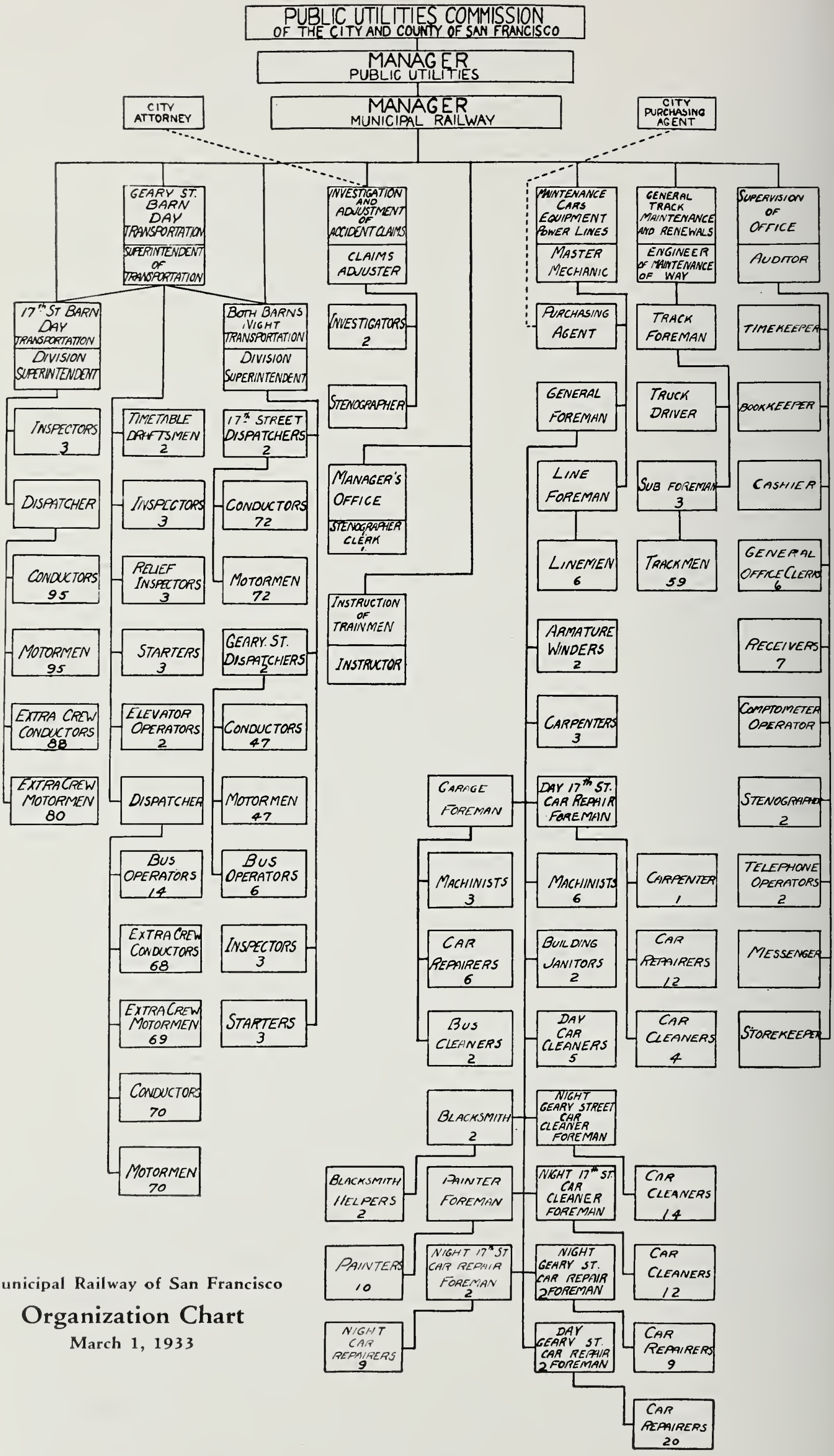
Fiscal Years Ending June 30, 1932 and June 30, 1933

	Fiscal Year 1932-33	Fiscal Year 1931-32	Increase
Rentals—Hangar	$ 8,760.17	$11,796.58	*$ 3,036.41*
" Office	457.50	540.00	*82.50*
" Shop	1,449.55	1,105.00	344.55
Other Income—Telephone	683.21	435.25	247.96
" " Telegrams	92.66		92.66
" " Airway Maps	6.65	4.45	2.20
" " Restaurant	250.00	575.00	*325.00*
" " Lockers	81.50	71.00	10.50
" " Miscellaneous	133.90	248.40	*114.55*
" " Garage	71.25		71.25
" " Passenger Tax	810.25		810.25
Total Accrued Revenue	$12,796.64	$14,775.73	*$ 1,979.09*

OPERATING EXPENSES

Salaries—Permanent	$ 9,133.00	$35,286.59	*$15,899.03*
" Temporary	10,254.56		
Maintenance and Repairs to Equipment	825.37	7,691.44	*6,627.32*
Maintenance and Repairs to Buildings	238.75		
Telephone, Telegraph and Postage	1,921.46	2,390.44	*468.98*
Printing, Engraving and Photography	204.44	3,513.12	*3,308.68*
Heat, Light, Power and Water	3,558.01	3,233.92	324.09
Public Utilities Commission Expense	600.00		600.00
Miscellaneous Contractual Expenses	2,313.47	7,375.75	*5,062.28*
Materials and Supplies	3,964.14	1,411.64	2,552.50
Insurance	125.60		125.60
Taxes	1,884.50	2,040.23	*155.73*
	$35,023.30	$62,943.13	*$27,919.83*
Net	*$22,226.66*	*$48,167.40*	*$25,940.74*
Accounts Receivable Charged to Profit and Loss	406.00	149.45	256.55
	$22,632.66	$48,316.85	*$25,684.19*
Memorandum: Record of Cash Receipts	$11,409.86	$12,986.00	*1,576.14*

Italics denote Loss or Deficiency.



Municipal Railway of San Francisco

Organization Chart

March 1, 1933

SAN FRANCISCO MUNICIPAL RAILWAY

FRED BOEKEN
Manager

Fiscal Year Ended June 30, 1932
and
Fiscal Year Ended June 30, 1933

Chronology:

December 2, 1902. Election. Proposition authorizing $700,000.00 bonds defeated.

October 8, 1903. Election. Proposition authorizing $710,000.00 bonds defeated.

November 6, 1903. Franchise of Geary Street, Park and Ocean Railroad Company expired.

June, 1906. Budget appropriation $325,000.00 for Geary Street Railroad. Used for reconstruction and rehabilitation of streets and buildings destroyed in disaster of April 18-22, 1906.

June, 1907. Budget appropriation $720,000.00 for Geary Street Railroad. Subsequently declared invalid by court.

June 24, 1909. Election. Proposition authorizing $1,950,000.00 bonds defeated, lacking 203 votes.

December 30, 1909. Election. Proposition authorizing $2,020,000.00 bonds carried by 20,000 majority.

April 16, 1910. Superior Court declares bond issue valid in every respect. Decision affirmed by Supreme Court in July, 1910.

July 18, 1910. First lot of bonds, $121,000.00 sold.

Summer, 1911. Construction of Geary Street Railway commenced.

May 5, 1912. The Geary Street, Park & Ocean Railroad (cable system) ceased operations.

December 28, 1912. The Municipal Railway (overhead trolley system) commenced operation on Geary Street from Kearny Street to Thirty-third Avenue and Park, with ten (10) cars, under direction of Thos. A. Cashin, Superintendent, Major James Rolph, Jr., acting as motorman on first car.

April 22, 1913. Referendum election. Agreement with Sutter Street Railroad Company respecting use of tracks on lower Market Street ratified.

June 25, 1913. Municipal Railway in full operation from Ferries to Beach and Park. Twenty-eight cars.

August 26, 1913. Election. Proposition authorizing $3,500,000.00 bonds for extensions of Municipal Railway carried by 37,670 majority.

December 11, 1913. Presidio & Ferries R. R. Company (Union Street Division), taken over by Municipal Railway.

May 16, 1914. Masonic Avenue branch completed.

August 15, 1914. Van Ness Avenue line from Market Street in operation to Exposition grounds.

September 7, 1914. Potrero Avenue line in operation, Eleventh and Market Streets to Twenty-fifth Street and Potrero Avenue.

December 29, 1914. Stockton Street, Columbus Avenue and North Point line in operation through tunnel.

December 29, 1914. Fort Mason Loop commenced operation.

February 10, 1915. Columbus Avenue line in operation from Ferries to Exposition grounds.

February 19, 1915. California Street line in operation to Thirteenth Avenue.

March 28, 1915. California Street line in operation to Thirty-third Avenue.

April 25, 1915. Beach loop, Geary Street line, commenced operation.

January 24, 1916. Stockton Street branch ("E") in operation from Presidio to Market, Fourth and Ellis Streets.

April 29, 1916. Church Street line (Sect. "C"), Sixteenth to Eighteenth and Twenty-second to Thirtieth Streets, ready for operation.

June 1, 1916. Columbus Avenue ("J" line), Ferries to Exposition Grounds, discontinued.

June 12, 1916. Church Street line (Sect. "A"), Van Ness Avenue and Market Street to Sixteenth and Church Streets. Started by day labor. Held up by United Railroads injunction.

June 28, 1916. Church Street line (Sect. "B"), Eighteenth to Twenty-second Streets, ready for operation.

December 21, 1916. Potrero Avenue line ("H") extended from Twenty-fifth Street to Army Street. Twenty-two hundredths mile added. Placed in operation January 19, 1917.

August 11, 1917. Church Street line ("J") Van Ness Avenue and Market Street to Church and Thirtieth Streets, commenced operation.

February 3, 1918. Twin Peaks tunnel line ("K") to Van Ness Avenue and Bush Street commenced operation. (Length of tunnel 11,920 feet.)

May 4, 1918. Greenwich Street extension (Van Ness Avenue line), Scott to Baker Street, commenced operation.

June 1, 1918. Market Street lines ("J" and "K"), Van Ness Avenue to Geary Street, commenced operation, establishing through service, Ferries to Sloat Boulevard.

October 30, 1918. Third loop opened at Ferry terminus.

February 21, 1919. Market Street line ("K") commenced operation over United Railroad tracks on Ocean Avenue to Miramar Avenue.

April 12, 1919. Taraval Street line ("L") commenced operation from west portal of Twin Peaks tunnel to Thirty-third Avenue, operating co-jointly with the United Railroads on Taraval Street between Twentieth Avenue and Thirty-third Avenue.

May 18, 1919. Market Street line ("K") commenced operation over extension along Ocean and Brighton Avenues to Grafton Avenue.

July 22, 1919. Changed and shortened route of Van Ness Avenue line ("D") and Union Street line ("E") by track connection on Union Street between Franklin Street and Van Ness Avenue.

August 7, 1919. One elevator placed in operation at Forest Hill station of Twin Peaks tunnel.

December 8, 1919. Presidio loop. Van Ness Avenue and Union Street lines commenced operation.

January 14, 1923. Taraval Street line ("L") commenced operation over extension on Taraval Street, between Thirty-third Avenue and Ocean Beach.

October 15, 1923. Taraval Street line ("L") operated as a through line from Beach to Ferries via Twin Peaks tunnel and Market Street.

October 6, 1925. Line ("M") commenced operation between Plymouth Avenue and Broad Street to St. Francis circle.

February 1, 1928. Second elevator (the largest on the Pacific Coast), installed at Forest Hill station of Twin Peaks tunnel.

October 21, 1928. Line "N" commenced operation between 48th Avenue and Judah Street and the Ferries.

January 8, 1932. Jurisdiction over the San Francisco Municipal Railway was transferred from the Board of Public Works to the San Francisco Public Utilities Commission under provisions of the new charter.

June 1, 1932. Line "O" commenced operation between Van Ness Avenue and Market Street and the Presidio (a rearrangement of Lines "D," "E" and "H").

July 15, 1932. Line "O" abandoned and lines "D," "E" and "H" placed on their original routing.

December 5, 1932. Line "A" discontinued.

December 5, 1932, Bus Route No. 1 extended to Tenth Avenue and Lake Street.

January 3, 1933. Bus Route No. 2 discontinued.

January 30, 1933. Bus Route No. 1 north terminal changed to Tenth Avenue and California Street. South terminal changed to Hearst Avenue and Genesee Street.

June 30, 1933. Total single track mileage, 83.62 (see mileage statement).

June 30, 1933. Total one-way bus mileage, 8.78 (see mileage statement).

Financial Report:

Fiscal year ended June 30, 1932—Operating revenue for the year was $3,189,355, a decrease of $247,823, or 7.21%, from the preceding year.

Fiscal year ended June 30, 1933—Operating revenue for the year was $2,820,600, a decrease of 11.56% from the preceding year. These decreases are principally due to the general business depression.

These decreases, however, are less than that experienced by other street railway operators in California for the same periods, as indicated by reports of the California Railroad Commission. These reports show average decreases approximating 13%, while the experience of the Municipal Railway for the same periods range from 8.63% to 11.56%. The decrease for the month of June, 1933 under that of June, 1932 was 6.34%, which indicates that the decrease curve is gradually flattening and that from now on we may expect an improvement in street railway business.

Fiscal year ended June 30, 1932—Operating expenses (not including reserves or bond interest) amounted to $2,982,620, a decrease of $207,961, or 6.52%, from the previous year.

Fiscal year ended June 30, 1933—Operating expenses (not including reserves or bond interest) amounted to $2,723,515, a decrease of $259,105, or 8.69%, from the previous year.

The greater part of the above savings was due to the adjustment of service to meet changing traffic conditions.

One bus line (No. 2), which was operated at a heavy loss, was discontinued; as was one car line ("A"), which duplicated other lines the major portion of its route.

In connection with operating expenses, it must be remembered that the Municipal Railway, unlike most private companies operating in California, has adopted the 8-hour day for its employes; and also maintains a wage scale which is approximately 60% higher than that of the privately owned and operated street railways.

In considering the financial results of the Municipal Railway it must be borne in mind that the fare has been maintained at 5 cents, with universal transfers between its own lines and at many intersections with the privately owned lines, without cost to the rider.

The average fare for street railways in the United States is approximately 8.3 cents. The fare of the Municipal Railway is, therefore, approximately 40% less than the average fare paid throughout the country.

The 5 cent fare in effect in San Francisco on the three street railway systems resulted in a saving to the car riders, for the last fiscal year, of approximately $7,000,000.

During the two year period, 7,613 lineal feet of single track was reconstructed, of which 6,125 was in paved track and 1,488 in open track.

As the result of experiments made with thermit welding of rail joints under traffic, the Municipal Railway purchased the necessary equipment and during the last year joints in bad condition from the westerly end of the "B" line to Geary and Steiner Streets, Market Street from Castro Street to Van Ness Avenue, Van Ness Avenue from Washington Street to Hayes Street, and a portion of Columbus Avenue, have been thermit welded. This work has been done without serious delay to traffic, and will result in a large decrease in maintenance cost.

The equipment of the Municipal Railway has been maintained in first class condition; 115 car bodies, 14 buses, and 3 service cars having been overhauled and painted; 600 motors were overhauled and repaired, as were 115 units of electrical control apparatus; 17.06 miles of 3/0 trolley wire was replaced.

During the fiscal year ended June 30, 1932, a survey was made by engineers of the Railroad Commission in accordance with the Ordinance of the Board of Supervisors No. 9005 N.S. Their conclusions were published in a report dated December 29, 1931, copies of which have been furnished your office.

So far as has been possible, recommendations contained in this report have been carried out. This has not been possible, however, in the case of several suggestions involving re-routing of carlines, as no funds are available under charter limitations with which to accomplish the necessary capital expenditures for new trackage, switches and overhead construction.

The recommendations of the Commission relative to platform labor restrictions, direct delivery of pay checks to employees, and elimination of half-day a week holiday to certain per diem employees were put into effect as far as was legally possible, with a resulting saving of $49,000 per year.

Re-arrangement of lines "D," "E" and "H," recommended by the commission, was put into effect on June 1, 1932, but it was found that the loss in travel and passenger revenue was greater than the saving in expense in operation. It was therefore abandoned on July 15, 1932.

On March 21, 1932, skip stop system of operation was put into effect in the outlying districts, with the result that the schedule speed was increased from 9.8 miles per hour to 10.16 miles per hour, and a saving was made in power costs.

The policy of the Municipal Railway during the twenty years of its operation has been that of service and development, with the result that the sum of $4,295,742 has been spent from income for additions and betterments, which included 32 miles of new trackage, 66 new street cars, and 32 new motor buses.

This policy has resulted in the rapid development of San Francisco and a large increase in the taxable value of the districts into which the Railway has pioneered. However, during this development period the Railway has suffered large losses by reason of the operation of lines into sparsely settled districts.

In accordance with prevailing policies of other companies, no emloyees were laid off by reason of reduction in service and other economies effected, the decreased amount of work being distributed among our entire force.

While this tended to reduce the earnings of the individual employee, the unemployment situation has not been aggravated by the adoption of this policy. However, no vacancies of platform men have been filled, and it is believed that by reason of deaths, resignations, retirements, etc., we will soon be working on a normal basis.

In accordance with the request of President Roosevelt, the representatives of the American Transit Association met in Washington on August 10th with a view to adopting a code in accord with the provisions of the National Recovery Act. As a result of this meeting a code was adopted and submitted to the President for his approval. The hours of labor and wages of Municipal Railway employees are so close to the requirements of this code that it is not expected that any great change will result from the adoption of this code.

As of May 1, 1933, Charter Amendment No. 1, providing for emergency deductions from employees' wages and salaries, ranging from 3% to 20%, was put into effect. This will continue throughout the remainder of the present fiscal year and will reduce operating expenses approximately $165,000 for the year.

Due to the various economies effected by the Public Utilities Commission, there was a surplus of about $157,000. This amount has been carried over into our budget for the present fiscal year as a credit to reduce the amount required from the General Fund.

It is interesting to note that the amount required from taxes for the second year of operation by the Commission has been reduced $218,902 from the year immediately preceding its control; although revenue in the same period shows a decrease of $753,388.

The cumulative effect of economies in operation inaugurated during the fiscal year 1932-33 is expected to be increasingly apparent during the fiscal year 1933-34, with the result that the sum required to be provided by taxes was reduced from an estimate of $493,000 for 1932-33 to $111,733 for 1933-34. This latter sum is little more than one-half of the $201,000 required for bond amortization. All other expenses, including the remaining $90,000 of bond redemption, are to be met from operating revenue of the railway.

On May 16, 1932, the Market Street Railway commenced operation of their Balboa Street line, which is in direct competition with our "B" line and also somewhat affects the revenue of other Geary Street lines. The operation of this line has resulted in the reduction of the receipts of our lines "B" and "C" by an amount approximating $60,000 per year.

As of June 30, 1933, there remained a total of $2,202,000 of bonds outstanding, as against the original issue of $5,481,000; there having been redeemed $3,279,000. The sum of $2,778,000 of this amount was paid from the funds of the Municipal Railway; the balance was contributed from the General Fund.

These bonds have matured and been redeemed in amounts varying from $196,000 to $201,000 annually; and will continue to mature at this rate until July 1, 1934, when the last bond of the Geary Street 4½% issue of 1910 and the Market Street Railway 4½% issue of 1910 will have been fully amortized, after which there will remain only the Municipal Railway 5% issue of 1913, which will mature at the rate of $100,000 a year until the final date of maturity, which is December 1, 1952. It is, therefore, apparent that after July 1, 1934, the Municipal Railway will be relieved of bond redemption charges, with the exception of $100,000 a year on the Municipal Railway issue.

On January 8, 1932, a new Charter was put into effect by the City and County of San Francisco. Under the terms of this Charter, the administration of the Municipal Railway was transferred from the Board of Public Works to a new board called the San Francisco Public Utilities Commission.

Since its inception in 1912 and until January 8, 1932, the Railway was under the jurisdiction of the Board of Public Works, acting through a Superintendent of the Municipal Railway. Under the terms of the new Charter, which became effective January 8, 1932, the operation, administration and control of all of the city utilities were placed under the jurisdiction of the newly created Commission. Serving as the executive of this Commission is a Manager of Utilities, to whom the Manager of the Municipal Railway is responsible.

REPORT OF AUDIT—1931-1932

November 14, 1932.

To the Honorable Public Utilities Commission,
City and County of San Francisco,
San Francisco, California.

Dear Sirs:

In accordance with instructions, we have audited the books and accounts of the Municipal Railway of the City and County of San Francisco for the fiscal year ended June 30, 1932, and submit herewith our report, together with the following statements:

Exhibit "A"—Comparative General Balance Sheets, June 30, 1932, and June 30, 1931.

Exhibit "B"—Comparative Statement of Monthly Income for the fiscal year ended June 30, 1932.

Exhibit "C"—Comparative Statement of Income for the period from December 28, 1912, to June 30, 1932.

Exhibit "D"—Fund Balance Sheet as at June 30, 1932.

Exhibit "E"—Statement of Bus Line Operations for the fiscal year ended June 30, 1932.

Exhibit "F"—Adjusted Balance Sheet as at June 30, 1932.

Schedule 1—Schedule of Road and Equipment as at June 30, 1932.

Schedule 2—Analysis of Reserve for Depreciation as at June 30, 1932.

Schedule 3—Statement of Operating Expenses by Primary Accounts as prescribed by the Interstate Commerce Commission for the fiscal year ended June 30, 1932.

We hereby certify that the attached comparative general balance sheet and statement of income, subject to the comments contained in this report, correctly reflect the financial condition of the Municipal Railway of San Francisco at June 30, 1932, as well as the results of operations for the fiscal year ended that date.

Respectfully submitted,

F. W. LAFRENTZ & CO.,
BULLOCK, KELLOGG & MITCHELL,
Certified Public Accountants.
By Fred D. Bullock.

General Balance Sheet—Exhibit "A"

Road and Equipment—$9,566,483.06

Schedule 1 of this report analyzes in detail the assets included in the above amount and shows the additions and retirements for the year under review. All changes in this account were investigated by us, and in our opinion were correctly handled. Depreciation in the amount of $285,893.02 has been provided for during the year in accordance with Ordinance No. 8570 N. S.

General Expenditures—$324,872.84

The items included under this caption are as follows:

Interest on Funded Debt During Construction	$252,270.75
Cost of Elections	57,092.91
Legal Expenses	12,778.65
Miscellaneous	2,730.53

CASH WITH TREASURER

Municipal Railway Bond Redemption Funds—$106,508.72

The undermentioned funds are maintained by transfers from the General Fund of the City and County of San Francisco to meet maturities as they become due:

Geary Street Issue of 1910	$ 97,705.57
Municipal Railway Issue of 1913	2,695.41
Market Street Issue of 1910	6,107.74
	$106,508.72

Municipal Railway Bond Interest Fund—$25,910.36

The fund analyzed below is also maintained by transfers from the General Fund and is for the purpose of meeting bond interest as it becomes due:

Geary Street Issue of 1910	$ 6,924.80
Municipal Railway Issue of 1913	18,544.33
Market Street Issue of 1910	441.23
	$25,910.36

Municipal Railway Operating Fund—$289,814.51

Accident Reserve Fund—$6,881.50

Depreciation Reserve Fund—$246,610.43

The amounts of the funds represented by the above balances were reconciled with the records of the Treasurer of the City and County of San Francisco.

In connection with the Accident Reserve Fund above, it will be noted that the offsetting reserve on the liability side of the balance sheet shows a debit balance of $9,678.71, a difference of $16,560.21. This latter amount is actually due the Municipal Railway Operating Fund, as will be clearly seen on examining the fund balance sheet, Exhibit "D."

Miscellaneous Accounts Receivable—$11,631.56

The following balances are due from outside sources:

State Board of Harbor Commissioners	$ 8,275.30
Pacific Gas and Electric Company	796.00
General Fund, City and County of San Francisco	2,545.27
Unemployed Relief Fund	14.99
	$11,631.56

The amount due from the State Board of Harbor Commissioners has accrued under agreement with that board whereby they undertake to indemnify the City and County of San Francisco for loss sustained in the operation of the Embarcadero Bus Line.

The account with the Pacific Gas and Electric Company covers pole rentals from January 1 to June 30, 1932, and the item of $2,545.27 shown as due from the General Fund represents interest accrued on Municipal Railway funds deposited with the Treasurer in accordance with Ordinance 8570 N. S.

The last named item above covers refunds due in connection with unemployed relief payroll.

All of the above items have been liquidated since June 30.

Materials and Supplies—$171,436.98

This represents the value of the materials and supplies on hand at June 30, 1932, and distributed as follows:

Pipe Yard, Sixth and Hubbell Streets	$105,315.34
Car Barn, Geary Street	66,121.64
	$171,436.98

The material at the pipe yard consists principally of material used for construction, and the material at the Geary Street Car Barn is used mainly in connection with operations.

A thorough test check of the stock records was made and agreement with the actual material on hand established by numerous counts of the articles in question. The prices, extensions and footings of the inventory were also examined, and we are of the opinion that the quantities and values reported are correct.

Manager's Contingent Fund—$4,000.00

This fund is maintained for the payment of accident claims and special investigation expenses and is in the custody of the following officers:

Mr. Fred Boeken, Manager	$ 700.00
Mr. T. B. Johnson, Claims Agent	3,300.00
	$4,000.00

The funds were reconciled by certification of banks and inspection of vouchers.

DUE FROM GENERAL FUND, CITY AND COUNTY OF SAN FRANCISCO—$82,123.73

The following advances made to the above fund remained uncleared at June 30, 1931:

Twin Peaks Tunnel—$32,152.53

The original amount of this advance made in April, 1919, was $82,152.53 and was used in connection with a contract for the Twin Peaks Tunnel. The amount was reduced in the year 1926-27 by a payment of $50,000.00.

Stockton Street Tunnel—$48,971.20

This amount was applied to the construction of the Stockton Street Tunnel in May, 1914.

Ocean Shore Railway Switching—$1,000.00

This advance made in October, 1922, was transferred to cover a deficit in the appropriation for this purpose.

Rent of Road Paid in Advance—$5,169.56

This item represents the unamortized balance of the cost of acquiring the right to operate Municipal Railway cars over Ocean Avenue, between Mission Street and Junipero Serra Boulevard, and over a private right of way from Ocean Avenue to Sloat Boulevard. The original cost of this privilege in December, 1918, was $100,000.00. The Municipal Railway has the right under the agreement to purchase the franchise on the above lines and apply thereto the $100,000.00 previously paid, after deducting therefrom $7,000.00 per annum for the time expired between December 13, 1918, and the date of purchase. The outlay of $100,000.00 has, therefore, been amortized at the rate of $7,000.00 per annum. The franchise for the Ocean Avenue segment has expired, and the franchise on the private right of way will expire on October 17, 1932.

Funded Debt Unmatured—$2,403,000.00

An analysis of the unmatured funded debt is given below. Of the amounts shown, $95,000.00 of the Geary Street issue and $6,000.00 of the Market Street issue matured July 1, 1932.

Issue	Total Issue	Matured 1931-32	Unmatured June 30, 1932	Date of Final Maturity
Geary Street, 4½%, 1910	$1,900,000.00	$ 95,000.00	$ 285,000.00	7-1-34
Market Street Railway, 4½%, 1910	81,000.00	5,000.00	18,000.00	7-1-34
Municipal Railway, 5%, 1913	3,500,000.00	100,000.00	2,100,000.00	12-1-52
	$5,481,000.00	$200,000.00	$2,403,000.00	

Audited Accounts and Wages Payable—$114,598.00

Demands unpaid at June 30, 1932, were reconciled with the records of the City Comptroller.

Miscellaneous Accounts Payable—$96,744.25

This amount covers the liability for certain current expenditures for which vouchers have not yet been made out by the City Comptroller. All the items included in this amount had been cleared at the time we made our verification.

Matured Interest on Funded Debt—$17,017.50

Interest coupons matured prior to June 30, 1932, and unpaid on that date are as follows:

Geary Street Issue of 1910	$ 292.50
Market Street Railway Issue of 1910	22.50
Municipal Railway Issue of 1913	16,702.50
	$17,017.50

In addition to the above there are coupons in the amount of $6,817.50 maturing on July 1, 1932, shown elsewhere in this report under Accrued Interest on Funded Debt.

Matured Funded Debt—$1,900.00

Bonds matured prior to June 30, 1932, and unpaid on that date are as follows:

Geary Street Issue of 1910	$1,000.00
Municipal Railway Issue of 1913	900.00
	$1,900.00

Accrued Interest on Funded Debt—$15,567.50

Accruals of interest not yet due were made to June 30, 1932, as follows:

Geary Street Issue of 1910, due July 1, 1932	$ 6,412.50
Market Street Railway Issue of 1910, due July 1, 1932	405.00
Municipal Railway Issue of 1913, due December 1, 1932	8,750.00
	$15,567.50

Reserve for Accidents—*$9,678.71*

Changes occurring in this reserve during the year are as follows:

Balance in Reserve Account, June 30, 1931	$ 6,871.50
Additions to Reserve During Year, 2½% of Gross Revenue in Accordance with Ordinance No. 8570 N. S.	79,733.87
Refund of Prior Year Claim	10.00
	$86,615.37
Claims Paid, Chargeable to the Reserve	96,294.08
Debit Balance of Reserve Account, June 30, 1932	*$ 9,678.71*

The above balance in the reserve account is represented by cash in the reserve fund and an amount due the Municipal Railway operating fund for claims paid out of that fund as follows:

Accident Reserve Fund Cash	$ 6,881.50
Due Municipal Railway Operating Fund	16,560.21
Net Deficit in Reserve Fund	$ 9,678.71

From the above analysis it will be seen that the provisions for accidents, authorized under Ordinance No. 7060 N. S. and subsequently under Ordinance No. 8570 N. S., have proved inadequate to meet the claims arising. The following statement will show in greater detail the deficiency from year to year:

Year	Provision by Charge to Operations	Other Credits	Claims Paid	Reserve Account Balance
May 1, 1926—Transferred from Old Depreciation Fund		$100,000.00		$100,000.00
May 1 to June 30, 1926	$ 14,066.28		$ 9,457.00	104,609.28
1926-27	84,954.69	*15.05*	72,774.20	116,774.72
1927-28	86,546.56	157.21	123,181.59	80,296.90
1928-29	87,053.33		105,893.63	61,456.60
1929-30	89,224.43		103,384.68	47,296.35
1930-31	85,929.44		126,344.29	6,887.50
1931-32	79,733.87		96,294.08	*9,678.71*
	$527,508.60	$100,142.16	$637,329.47	

Italics denote Loss or Deficiency.

Reserve for Accrued Depreciation, Road and Equipment—$4,970,387.56

Depreciation has been charged to operations at the rate of 3% of all road and equipment in accordance with Ordinance No. 8570 N. S. Schedule 2 of this report analyzes this account and shows the application of the above rate to the different types of assets as stated hereunder:

Depreciation on Equipment and Certain Other Assets in Property Ledger at Rates Based on the Life of Specific Types of Property	$117,388.73
Balance of Provision for Depreciation Applicable to Track, Roadway and Distributing System	168,504.29
Total Provision Being 3% of All Properties	$285,893.02
Resulting Rate of Depreciation on Track, Roadway and Distributing System	3.019%

Due to lack of cash in the operating fund, the transfer of cash from that fund to the depreciation fund, as contemplated in Ordinances No. 7060 N. S. and 8570 N. S., could not be fully complied with during the current and certain preceding years, as shown in the following analysis:

Year		
1927-28		$ 36,684.20
1928-29		263,823.68
1929-30		281,373.60
1930-31		175,821.65
1931-32—Total Provision as per Schedule 2	$285,893.02	
Less: Expended from Operating Fund for Repairs and Reconstruction	52,871.96	233,021.06
Total Due from Operating Fund		$990,724.19

In addition to the delay in the accumulation of cash in the fund account there were certain applications made of the funds provided for the depreciation accounts, consideration of which is necessary to reconcile the depreciation reserve fund with the depreciation reserve, as explained hereunder:

Provision for Depreciation as per Schedule 2 of this Report		$5,181,555.67
Retirements, Years 1921-28, not shown on Schedule		115,472.34
Add: Provision for Redemption of Bonded Debt Added to Reserve, Fiscal Years 1913-26	$2,029,666.67	
Interest and Profit on Sale of Securities Credited to Income and Included in Surplus	496,911.82	
Transfers from Other Funds	21,722.46	2,548,300.95
		$7,845,328.96
Deduct: Cash on Hand	$ 246,610.43	
Less: Outstanding Warrants	43.89	
	$ 246,566.54	
Due from Operating Fund, as shown above	990,724.19	1,237,290.73
Total Cash to be Accounted for		$6,608,038.23

Accounted for as follows:

Payments for Injuries and Damage Claims	$ 571,963.75	
Bonds Redeemed and Interest Paid	2,056,616.90	
Advanced to Operating Fund for Twin Peaks Tunnel	82,152.53	
Transferred to Operating Fund for Wage Increases, etc.	717,354.43	
Expended for Extensions, Betterments and Replacements	3,179,950.62	
Total Accounted for		$6,608,038.23

Surplus—$3,231,907.15

Surplus has been classified in Exhibit "A" under three main groups, as shown hereunder:

Contributed Surplus—$1,049,938.55

General Taxes—$999,938.17

Contributions from the General Fund of the City and County of San Francisco, amounting to $99,938.17, are made up as follows:

Interest on Bonded Debt, 1910-15	$239,901.83
Cost of Bond Elections, 1909-13	29,628.54
Contributory Services of Employees	37,022.10
West Portal Avenue Improvement	15,180.21
Street Improvements, St. Francis Circle	18,551.41
Bond Interest and Redemption, Years 1930-32	658,454.08
Crane Transferred from High Pressure System	1,200.00
	$999,938.17

Premium on Bonds Sold—$26,000.38

Premiums on bonds sold in the years 1913 and 1914 were added to surplus because of the small effect that would result if credited to operations during any one year.

Donated Equipment—$24,000.00

This represents the value of three Pierce-Arrow buses donated by the residents of Westwood Park.

Provision for Comparative Charges—$4,848,649.86

Taxes—$4,749,796.75

The provisions of the Charter of the City and County of San Francisco require the reports of the Municipal Railway to reflect the charges for taxes and insurance which would have to be paid if the railway were privately operated. The following charges have, therefore, been made to operations and are reflected in surplus as hereunder:

Taxes of the State of California	$2,717,923.98
Franchise Taxes of the City and County of San Francisco	1,937,937.76
Car Licenses	56,238.75
Federal Income Tax	37,696.26
	$4,749,796.75

Insurance—$98,853.11

In accordance with the provisions of the Charter referred to above, fire insurance charges have been included and are based on a rate of $0.40 per $100.00 of valuation of street cars and buses.

Deficit Arising from Operations—$2,666,681.26

An analysis of the results of operations for the fiscal year ended June 30, 1932, is given in Exhibit "B," and in Exhibit "C" will be found a comparative analysis of operations since the inception of the railway in 1912.

Net Surplus—$3,231,907.15

Changes in the surplus for the year have been as follows:

Balance, June 30, 1931, as per Records	$3,163,511.33
Net Loss from Operations for the Year Ended June 30, 1932, Before Comparison Charges	260,623.26
	$2,902,888.07
Add: Contributions from General Taxes:	
Bond Interest and Redemption, 1931-32	$ 327,819.08
Crane Transferred from High Pressure System	1,200.00
Net Surplus, June 30, 1932	$3,231,907.15

Comparative Statement of Income—Exhibit "C"

Exhibit "C" shows the results of operations in detail for the period December 28, 1912, to June 30, 1932.

From a perusal of the figures shown in this statement it will be seen that, while the percentage of operating expenses to revenue for the year was approximately 94%, the percentage for the period December 28, 1912, to June 30, 1932, was 78%, or 16% less.

Fund Balance Sheet—Exhibit "D"

As already disclosed in a previous report, this statement shows the delay in transferring funds from the operating fund to the depreciation fund. This has on June 30, 1932, resulted in an amount of $990,724.19 being owed from the former fund to the latter fund.

Adjusted Balance Sheet—Exhibit "F"

Exhibit "F" sets forth a supplementary adjusted balance sheet, which, in our opinion, more accurately portrays the true conditions. We are also enclosing the necessary journal entries to bring the books into agreement therewith.

The changes made in this statement are explained hereunder:

Due from Operating Fund to Depreciation Reserve Fund—$990,724.19

Ordinances Nos. 7060 and 8570 N. S. contemplate the transfer of cash to the depreciation reserve fund, equal to the annual provision for depreciation, less amounts expended for repairs and reconstruction. Due to lack of cash, this provision was not fully complied with during prior years, as under:

Year	
1927-28	$ 36,684.20
1928-29	263,823.68
1929-30	281,373.60
1930-31	175,821.65
1931-32	233,021.06
	$990,724.19

Reserve for Depreciation—$1,237,290.73

This reserve equals the amount of assets which should be available under the provisions of the governing ordinance. These available assets consist of the following:

Cash in Treasury	$ 246,610.43
Due from Operating Fund	990,724.19
	$1,237,334.62
Less: Outstanding Warrants	43.89
	$1,237,290.73

A reconciliation between this balance and the book balance of the reserve may be shown as follows:

Balance, June 30, 1932 (per Books)			$4,970,387.56
Add:			
Interest and Profit on Sale of Securities Credit to Income and Included in Surplus		$ 496,911.82	
Transfers from Other Funds		21,722.46	
Provisions for Redemption of Bonded Indebtedness, Years 1913-26		2,029,666.67	2,548,300.95
			$7,518,688.51
Deduct:			
Expended for Additions, Betterments and Replacements	$3,179,950.62		
Less: Retirements Charged to Reserve	326,640.45	$2,853,310.17	
Advances to General Fund, Twin Peaks Tunnel		82,152.53	
Transferred to Operating Fund to Cover Wage Increases, etc.		717,354.43	
Payments for Injuries and Damages		571,963.75	
Bonds Retired Through Income, Years 1921-26		1,887,000.00	
Transferred to Operating Fund to Provide for Bond Interest and Redemption, Year 1927-28		169,616.90	6,281,397.78
Balance, as per Report, June 30, 1932			$1,237,290.73

Surplus—$6,905,789.62

This is made up as follows:

Bonds Retired Through Income	$2,778,000.00
Advances, General Fund, Twin Peaks Tunnel	32,152.53
Advances, General Fund, Stockton Street Tunnel	48,971.20
Advances, General Fund, Ocean Shore Railroad Switching	1,000.00
Additions and Betterments from Income	4,295,742.08
Charter Reserves for Taxes	2,465,246.75
Operating Surplus	*2,715,322.94*
	$6,905,789.62

In connection with the above items the first covering bonds retired through income is self-explanatory, and the advances to the general fund have been referred to elsewhere in this report. The amount covering additions and betterments represents the value of addition and betterment work performed which was paid out of the operations of the road. A portion of the cash used for this purpose was taken from the depreciation fund and the balance from the operating fund.

In accordance with Charter provisions, there have been charged to earnings of the Municipal Railway certain amounts representing insurance and taxes which would have to be paid if the Railway were operated by private capital. As the municipal system is exempt from paying such charges, the receipts from operations were deposited in the operating fund without any restriction as to how they were to be used. However, most of the cash in the operating fund represented by these obligatory charges was spent for additions and betterments. In order, therefore, to reflect the actual condition in the balance sheet, the amount expended for this purpose has been shown as "Additions and Betterments from Income." The account, "Charter Reserves for Taxes," carries a balance equal to the unused portion of the original reserve.

General

The preparation of the statements submitted with this report was made possible by the excellent condition of the records, which are maintained strictly in accordance with the classifications prescribed by the Interstate Commerce Commission.

Italics denote Loss or Deficiency.

Exhibit "A"—Comparative General Balance Sheet as of June 30, 1932, and June 30, 1931

ASSETS

	June 30, 1932	June 30, 1931	Increase *Decrease*
Road and Equipment (Schedule 1)	$ 9,566,483.06	$ 9,529,767.24	$36,715.82
General Expenditures	324,872.84	324,872.84	
Total Property Investment	$ 9,891,355.90	$ 9,854,640.08	$36,715.82
Current Assets:			
Cash with Treasurer:			
Municipal Railway Bond Redemption Fund	$ 106,508.72	$ 106,900.00	*$ 391.28*
Municipal Railway Bond Interest Fund	25,910.36	34,192.50	*8,282.14*
Municipal Railway Operating Fund	289,814.51	273,037.50	16,777.01
Accident Reserve Fund	6,881.50	46,095.56	*39,214.06*
Depreciation Reserve Fund	246,610.43	246,265.41	345.02
Miscellaneous Accounts Receivable	11,631.56	9,595.71	2,035.85
Materials and Supplies	171,436.98	190,580.70	*19,143.72*
Accrued Interest Receivable	....	3,175.00	*3,175.00*
Manager's Contingent Fund	4,000.00	4,000.00	....
Total Current Assets	$ 862,794.06	$ 913,842.38	*$51,048.32*
Unadjusted Debits:			
Due from General Fund, City and County of San Francisco:			
Advance on Twin Peaks Tunnel	$ 32,152.53	$ 32,152.53	....
Advance on Stockton St. Tunnel	48,971.20	48,971.20	....
Advance on Ocean Shore R. R. Switching	1,000.00	1,000.00	....
Total Due from City	$ 82,123.73	$ 82,123.73	....
Replacement Jobs in Process	....	9,069.81	*$ 9,069.81*
Rent of Road Paid in Advance	5,169.56	12,169.56	*7,000.00*
Total Unadjusted Debits	$ 87,293.29	$ 103,363.10	*$16,069.81*
	$10,841,443.25	$10,871,845.56	*$30,402.31*

Italics denote Loss or Deficiency.

LIABILITIES AND SURPLUS

	June 30, 1932	June 30, 1931	Increase *Decrease*
Funded Debt Unmatured	$ 2,403,000.00	$ 2,603,000.00	*$200,000.00*
Current Liabilities:			
Audited Accounts and Wages Payable:			
Municipal Ry. Operating Fund	$ 114,554.11	$ 291,360.13	*$176,806.02*
Depreciation Reserve Fund	43.89	43.89	....
Miscellaneous Accounts Payable	96,744.25	43,364.29	53,379.96
Matured Interest on Funded Debt	17,017.50	25,125.00	*8,107.50*
Matured Funded Debt	1,900.00	6,900.00	*5,000.00*
Accrued Interest on Funded Debt, Not Due	15,567.50	18,234.17	*2,666.67*
Total Current Liabilities	$ 245,827.25	$ 385,027.48	*$139,200.23*
Reserve for Accidents	*$ 9,678.71*	$ 6,871.50	*$ 16,550.21*
Reserve for Accrued Depreciation, Road and Equipment (Schedule 2)	4,970,387.56	4,713,435.25	256,952.31
Total Reserves	$ 4,960,708.85	$ 4,720,306.75	$240,402.10
Surplus:			
Contributed:			
General Taxes	$ 999,938.17	$ 670,919.09	$329,019.03
Premium on Bonds Sold	26,000.38	26,000.38	....
Donated Equipment	24,000.00	24,000.00	....
Total Contributed Surplus	$ 1,049,938.55	$ 720,919.47	$329,019.03
Provision for Comparative Charges:			
Taxes	$ 4,749,796.75	$ 4,469,440.37	$280,356.38
Insurance	98,853.11	93,017.27	5,835.84
Total Provision for Comparative Charges	$ 4,848,649.86	$ 4,562,457.64	$286,192.22
Surplus from Operations (Exhibit "C")	*2,666,681.26*	*2,119,865.78*	*546,815.48*
Total Net Surplus	$ 3,231,907.15	$ 3,163,511.33	$ 68,395.82
	$10,841,443.25	$10,871,845.56	*$ 30,402.31*

Italics denote Loss or Deficiency.

Exhibit "B"—Comparative Statement of Monthly Income for the Fiscal Year Ended June 30, 1932

	Total	July 1931	August 1931	September 1931	October 1931	November 1931	December 1931	January 1932	February 1932	March 1932	April 1932	May 1932	June 1932
Operating Revenues:													
Passenger Revenue	$3,163,188.68	$266,328.75	$281,040.65	$271,379.45	$283,213.30	$259,144.55	$270,230.10	$261,848.75	$247,636.75	$272,765.20	$260,356.35	$253,093.68	$236,151.15
Miscellaneous Operating Revenue	26,166.26	2,029.17	2,029.17	2,032.67	2,211.17	2,034.21	2,037.14	2,824.17	2,040.31	2,035.79	2,033.37	2,029.17	2,829.92
Total Operating Revenues	$3,189,354.94	$268,357.92	$283,069.82	$273,412.12	$285,424.47	$261,178.76	$272,267.24	$264,672.92	$249,677.06	$274,800.99	$262,389.72	$255,122.85	$238,981.07
Operating Expenses:													
Way and Structures	$ 166,658.58	$ 10,173.19	$ 12,886.56	$ 13,413.65	$ 15,710.94	$ 12,551.51	$ 14,498.48	$ 15,283.82	$ 14,892.59	$ 17,038.23	$ 11,847.30	$ 13,551.22	$ 14,811.09
Equipment	192,695.30	19,069.44	17,685.91	15,837.50	17,024.02	16,854.99	17,851.74	14,473.52	13,889.85	15,804.04	15,066.74	14,325.09	14,812.46
Power	497,941.00	41,059.98	41,768.06	40,746.23	41,491.08	41,305.42	42,933.36	42,761.79	40,530.99	42,836.64	41,098.80	41,823.40	39,585.25
Conducting Transportation	1,911,307.18	165,582.91	165,544.20	158,885.22	164,754.47	156,366.33	161,435.79	161,223.10	150,788.53	163,274.18	156,044.25	157,709.66	149,698.54
General and Miscellaneous	218,078.12	17,629.98	19,095.46	18,174.01	18,770.18	17,668.68	18,527.80	17,771.09	20,218.15	17,310.16	17,672.01	17,236.38	18,004.22
Transportation for Investment	*4,060.00*	*591.00*	*464.00*	*301.50*	*287.50*	*366.00*	*129.00*	*170.75*	*137.50*	*284.25*	*686.25*	*312.50*	*329.75*
Total Operating Expenses	$2,982,620.18	$252,924.50	$256,516.19	$246,755.11	$257,463.19	$244,380.93	$255,118.17	$251,342.57	$240,182.61	$255,979.00	$241,042.85	$244,333.25	$236,581.81
Profit from Operations	$ 206,734.76	$ 15,433.42	$ 26,553.63	$ 26,657.01	$ 27,961.28	$ 16,797.83	$ 17,149.07	$ 13,330.35	$ 9,494.45	$ 18,821.99	$ 21,346.87	$ 10,789.60	$ 2,399.26
Deduct Provision for:													
Depreciation	$ 285,893.02	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.42	$ 23,824.40
Accidents	79,733.87	6,708.95	7,076.75	6,835.30	7,135.61	6,529.47	6,826.56	6,596.95	6,241.93	6,870.02	6,559.74	6,378.07	5,974.52
Total Deductions	$ 365,626.89	$ 30,533.37	$ 30,901.17	$ 30,659.72	$ 30,960.03	$ 30,353.89	$ 30,650.98	$ 30,421.37	$ 30,066.35	$ 30,694.44	$ 30,384.16	$ 30,202.49	$ 29,798.92
Income from Operations	*$ 158,892.13*	*$ 15,099.95*	*$ 4,347.54*	*$ 4,002.71*	*$ 2,998.75*	*$ 13,556.06*	*$ 13,501.91*	*$ 17,091.02*	*$ 20,571.90*	*$ 11,872.45*	*$ 9,037.29*	*$19,412.89*	*$ 27,399.66*
Non Operating Income:													
Subsidy from Harbor Bus Line	$ 8,275.30	$ 669.20	$ 239.44	$ 467.80	$ 655.90	$ 743.98	$ 862.63	$ 757.48	$ 799.82	$ 849.44	$ 684.73	$ 847.63	$ 697.25
Interest on Bank Balances	10,452.38			2,350.00			2,648.60			2,465.88	442.63		2,545.27
Miscellaneous Credits	259.52			10.73				41.70		198.81			8.28
Total Non Operating Income	$ 18,987.20	$ 669.20	$ 239.44	$ 2,828.53	$ 655.90	$ 743.98	$ 3,511.23	$ 799.18	$ 799.82	$ 3,514.13	$ 1,127.36	$ 847.63	$ 3,250.80
Gross Income	*$ 139,904.93*	*$ 14,430.75*	*$ 4,108.10*	*$ 1,174.18*	*$ 2,342.85*	*$ 12,812.08*	*$ 9,990.68*	*$ 16,291.84*	*$ 19,772.08*	*$ 8,358.32*	*$ 7,909.93*	*$ 18,565.26*	*$ 24,148.86*
Deductions from Gross Income:													
Interest on Funded Debt	$ 120,718.33	$ 10,302.91	$ 10,302.92	$ 10,302.92	$ 10,302.92	$ 10,302.91	$ 9,886.25	$ 9,886.25	$ 9,886.25	$ 9,886.25	$ 9,886.25	$ 9,886.25	$ 9,886.25
Net Income before Comparative Charges	*$ 260,623.26*	*$ 24,733.66*	*$ 14,411.02*	*$ 11,477.10*	*$ 12,645.77*	*$ 23,114.99*	*$ 19,876.93*	*$ 26,178.09*	*$ 29,658.33*	*$ 18,244.57*	*$ 17,796.18*	*$ 28,451.51*	*$ 34,035.11*
Deduct Charter Comparative Charges:													
Taxes Assignable	$ 280,356.38	$ 23,561.45	$ 24,872.12	$ 24,042.80	$ 25,061.42	$ 22,961.13	$ 23,935.51	$ 23,207.00	$ 21,991.85	$ 24,174.26	$ 23,103.40	$ 22,462.41	$ 20,983.03
Fire Insurance	5,835.84	486.32	486.32	486.32	486.32	486.32	486.32	486.32	486.32	486.32	486.32	486.32	486.32
Total Comparative Charges	$ 286,192.22	$ 24,047.77	$ 25,358.44	$ 24,529.12	$ 25,547.74	$ 23,447.45	$ 24,421.83	$ 23,693.32	$ 22,478.17	$ 24,660.58	$ 23,589.72	$ 22,948.73	$ 21,469.35
Profit and Loss Balance	*$ 546,815.48*	*$ 48,781.43*	*$ 39,769.46*	*$ 36,006.22*	*$ 38,193.51*	*$ 46,562.44*	*$ 44,298.76*	*$ 49,871.41*	*$ 52,136.50*	*$ 42,905.15*	*$ 41,385.90*	*$ 51,400.24*	*$ 55,504.46*

Italics denote Loss or Deficiency.

Exhibit "C"—Comparative Statement of Income for the Period from Dec. 28, 1912, to June 30, 1932

	Period Dec. 28, 1912 to June 30, 1931		Period July 1, 1930 to June 30, 1931		Period July 1, 1931 to June 30, 1932		Period Dec. 28, 1912 to June 30, 1932	
	Amount	Per Cent of Passenger Revenue	Amount	Per Cent of Passenger Revenue	Amount	Per Cent of Passenger Revenue	Amount	Per Cent of Passenger Revenue
Passenger Revenue	$49,384,396.58	100.000	$3,409,103.00	100.000	$3,163,188.68	100.000	$52,547,585.26	100.000
Miscellaneous Revenue	233,954.73		28,074.74		26,166.26		260,120.99	
Total Revenue	$49,618,351.31		$3,437,177.74		$3,189,354.94		$52,807,706.25	
Operating Expenses:								
Way and Structures	$ 1,836,194.16	3.718	$ 182,379.14	5.350	$ 166,658.58	5.269	$ 2,002,852.74	3.811
Equipment	3,041,525.94	6.159	230,263.41	6.754	192,695.30	6.092	3,234,221.24	6.155
Power	6,977,788.34	14.130	557,418.43	16.351	497,941.00	15.742	7,475,729.34	14.226
Conducting Transportation	24,089,501.36	48.780	2,015,583.80	59.124	1,911,307.18	60.423	26,000,808.54	49.481
Traffic	4,576.70	.009					4,576.70	.009
General and Miscellaneous	2,448,330.49	4.958	209,522.30	6.146	218,078.12	6.894	2,666,408.61	5.074
Transportation for Investment	*10,698.00*	*.022*	*4,586.50*	*.135*	*4.060.00*	*.128*	*14,758.00*	*.028*
Total Operating Expenses	$38,387,218.99	77.732	$3,190,580.58	93.590	$2,982,620.18	94.292	$41,369,839.17	78.728
Profit from Operations	$11,231,132.32	22.742	$ 246,597.16	7.234	$ 206,734.76	6.536	$11,437,867.08	21.767
Deduct Provision for:								
Depreciation	$ 5,011,134.99	10.147	$ 283,536.12	8.317	$ 285,893.02	9.038	$ 5,297,028.01	10.081
Accidents	1,019,738.48	2.065	85,929.44	2.521	79,733.87	2.521	1,099,472.35	2.092
Total Deductions	$ 6,030,873.47	12.212	$ 369,465.56	10.838	$ 365,626.89	11.559	$ 6,396,500.36	12.173
Income from Operations	$ 5,200,258.85	10.530	$ *122,868.40*	*3.604*	$ *158,892.13*	*5.023*	$ 5,041,366.72	9.594
Non-Operating Income:								
Income from Sinking Fund and Other Reserves	$ 596,895.75	1.198	$ 25,841.03	.606			$ 596,895.75	1.136
Subsidy from Harbor Bus Line	34,772.51	.071	8,127.12	.238	$ 10,452.38	.330	43,047.81	.082
Interest on Bank Balances	5,158.26	.010	1,680.32	.049	8,275.30	.262	15,610.64	.029
Miscellaneous Credits	171,398.52	.358	2,635.00	.230	259.52	.008	171,658.04	.327
Total Non-Operating Income	$ 808,225.04	1.637	$ 38,283.47	1.123	$ 18,987.20	.600	$ 827,212.24	1.574
Gross Income	$ 6,008,483.89	12.167	$ *84,584.93*	*2.481*	$ *139,904.93*	*4.423*	$ 5,868,578.96	11.168
Deductions from Gross Income:								
Interest on Funded Debt	$ 3,483,830.91	7.055	$ 130,218.34	3.820	$ 120,718.33	3.816	$ 3,604,549.24	6.860
Interest on Unfunded Debt	12,510.73	.025	1,259.87	.037			12,510.73	.024
Miscellaneous Debits	69.550.39	.141	17.00				69,550.39	.132
Total Deductions from Gross Income	$ 3,565,892.03	7.221	$ 131,495.21	3.857	$ 120,718.33	3.816	$ 3,686,610.36	7.016
Net Income Before Comparative Charges	$ 2,442,591.86	4.946	$ *216,080.14*	*6.338*	$ *260,623.26*	*8.239*	$ 2,181,968.60	4.152
Deduct Charter Comparative Charges:								
Taxes Assignable	$ 4,469,440.37	9.051	$ 313,975.40	9.210	$ 280,356.38	8.863	$ 4,749,796.75	9.039
Fire Insurance	93,017.27	.188	6,036.36	.177	5,835.84	.185	98,853.11	.188
Total Comparative Charges	$ 4,562,457.64	9.239	$ 320,011.76	9.387	$ 286,192.22	9.018	$ 4.848,619.86	9.227
Profit and Loss Balance	$ *2,119,865.78*	*4.293*	$ *536,091.90*	*15.725*	$ *546,815.48*	*17.287*	$ *2,666,681.26*	5.075

Italics indicate loss or deficiency.

Exhibit "D"—Fund Balance Sheet as at June 30, 1932

Resources	Municipal Railway Operating	Accident Reserve	Depreciation Reserve	Total
Available Cash	$175,260.40	$ 6,881.50	$ 246,566.54	$ 428,708.44
*Other Resources	93,755.29	....	....	93,755.29
Due from Other Funds	16,560.21	....	990,724.19	1,007,284.40
	$285,575.90	$ 6,881.50	$1,237,290.73	$1,529,748.13
Liabilities and Unencumbered Balances				
**Reserves	$ 96,744.25	....	....	$ 96,744.25
Due to Other Funds	990,724.19	$16,560.21	....	1,007,284.40
Unencumbered Balances	*801,892.54*	*9,678.71*	$1,237,290.73	425,719.48
	$285,575.90	$ 6,881.50	$1,237,290.73	$1,529,748.13

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*Accounts Receivable Due From:

City and County of San Francisco:		
Advances on Account of Twin Peaks Tunnel	$32,152.53	
Advances on Account of Ocean Shore Railway	48,971.20	
Advances on Account of Stockton Street Tunnel	1,000.00	$82,123.73
Board of State Harbor Commissioners, Bus Subsidy		8,275.30
Pacific Gas and Electric Co., Pole Rental		796.00
Accrued Interest on Deposits with City Treasurer		2,545.27
Miscellaneous Refunds		14.99
		$93,755.29

**Liability for Expenditures which the City Comptroller has not yet vouched.

Italics denote Loss or Deficiency.

Exhibit "E"—Statement of Bus Line Operations for the Fiscal Year Ended June 30, 1932

		Routes	
Revenues:	Combined	Embarcadero	Others
Passenger Revenue	$ 96,335.35	$32,380.95	$ 63,954.40
Miscellaneous Revenue	30,632.95	10.03	30,622.92
Total Revenue	$126,968.30	$32,390.98	$ 94,577.32
Expense of Operation:			
Repairs, Painting, etc.	$ 22,911.44	$ 4,716.47	$ 18,194.97
Tires, Including Repairs	6,626.64	1,359.51	5,267.13
Gasoline and Oils	18,326.59	3,766.14	14,560.45
Cleaning, Washing and Servicing	14,540.97	2,987.63	11,553.34
Conductors' and Chauffeurs' Salaries and Wages	59,375.25	13,009.70	46,365.55
Depreciation of Buses and Equipment	24,247.56	5,142.82	19,104.74
Proportion of General Expense:			
Insurance	16,139.98	3,316.34	12,823.64
Administrative Salaries	9,600.00	1,972.51	7,627.49
Pension Fund Payments	4,200.00	863.08	3,336.92
Equipment Rental	3,294.00	676.94	2,617.06
Garage Rental	3,000.00	616.43	2,383.57
Storeroom Expense	3,201.36	658.04	2,543.32
Stationery and Printing	300.00	61.93	238.07
Total Expense	$185,763.79	$39,147.54	$146,616.25
Loss from Operations	$ 58,795.49	$ 6,756.56	$ 52,038.93
Add: Interest on Investment	7,634.87	1,518.74	6,116.13
Loss on Garage Equipment Retired	14.87	....	14.87
Net Loss for Period	$ 66,445.23	$ 8,275.30	$ 58,169.93

Exhibit "F"—Adjusted Balance Sheet as at June 30, 1932

ASSETS

Road and Equipment		$9,566,483.06	
General Expenditures		324,872.84	
Total Property Investment			$ 9,891,355.90
Current Assets:			
Cash with Treasurer:			
Municipal Railway Bond Redemption Fund		$ 106,508.72	
Municipal Railway Bond Interest Fund		25,910.36	
Municipal Railway Operating Fund		289,814.51	
Accident Reserve Fund		6,881.50	
Depreciation Reserve Fund		246,610.43	
Due from Operating Fund to Depreciation Fund		990,724.19	
Miscellaneous Accounts Receivable		11,631.56	
Materials and Supplies		171,436.98	
Manager's Contingent Fund		4,000.00	
Total Current Assets			1,853,518.25
Unadjusted Debits:			
Due from General Fund, City and County of San Francisco:			
Advance on Twin Peaks Tunnel	$32,152.53		
Advance on Stockton Street Tunnel	48,971.20		
Advance on Ocean Shore Railroad Switching	1,000.00		
Total Due from City		$ 82,123.73	
Rent of Road Paid in Advance		5,169.56	
Total Unadjusted Debits			87,293.29
			$11,832,167.44

LIABILITIES AND SURPLUS

Funded Debt Unmatured			$ 2,403,000.00
Current Liabilities:			
Audited Accounts and Wages Payable:			
Municipal Railway Operating Fund	$114,554.11		
Deprecation Reserve Fund	43.89	$ 114,598.00	
Miscellaneous Accounts Payable		96,744.25	
Matured Interest on Funded Debt		17,017.50	
Matured Funded Debt		1,900.00	
Accrued Interest on Funded Debt Not Due		15,567.50	
Total Current Liabilities			245,827.25
Reserves:			
For Accident		*$ 9,678.71*	
For Depreciation		1,237,290.73	
Total Reserves			1,227,612.02
Surplus:			
Contributed:			
General Taxes		$ 999,938.17	
Premium on Bonds Sold		26,000.38	
Donated Equipment		24,000.00	
Total Contributed Surplus		$1,049,938.55	
Surplus from Income:			
Bonds Retired Through Income		$2,778,000.00	
Advances, General Fund, Twin Peaks Tunnel		32,152.53	
Advances, General Fund, Stockton Street Tunnel		48,971.20	
Advances, General Fund, Ocean Shore Railroad Switching		1,000.00	
Additions and Betterments from Income		4,295,742.08	
Charter Reserve from Taxes and Insurance		2,465,246.75	
Operating Surplus		*2,715,322.94*	
Surplus from Income		$6,905,789.62	
Total Surplus			7,955,728.17
			$11,832,167.44

Italics denote Loss or Deficiency.

Schedule 1—Road and Equipment as at June 30, 1932

Account Number		Balance June 30, 1931	Additions Fiscal Year 1931-32				Retirements During Fiscal Year 1931-32	Net Additions Fiscal Year 1931-32	Balance June 30, 1932
			Depreciation Reserve Fund	Municipal Railway Fund	Donated Equipment	Total			
Way and Structures:									
501	Engineering and Superintendence	$ 403,572.91	$ 2,213.66			$ 2,213.66	$ 1,253.48	$ 960.18	$ 404,533.09
502	Right of Way	169,839.07							169,839.07
503	Other Land Used in Electric Railway Operations	265,490.48							265,490.48
504	Grading	455,768.35							455,768.35
505	Ballast	323,491.27	1,511.29			1,511.29	329.44	1,181.85	324,673.12
506	Ties	171,439.08	1,173.38			1,173.38	771.52	401.86	171,840.94
507	Rails, Rail Fastenings and Joints	843,045.76	9,987.66			9,987.66	2,950.28	7,037.38	850,083.14
508	Special Work	295,946.35	9,538.85	$ 218.00		9,756.85	5,973.48	3,783.37	299,729.72
510	Track and Roadway Work	679,616.79	24,892.98			24,892.98	7,754.35	17,138.63	696,755.42
511	Paving	1,109,695.42	7,622.26			7,622.26	8,268.16	*645.90*	1,109,049.52
512	Roadway, Machinery and Tools	16,707.61		32.58		32.58		32.58	16,740.19
513	Tunnels and Subways	13,600.00							13,600.00
515	Bridges, Trestles and Culverts	4,231.42							4,231.42
516	Crossings, Fences and Signs	41,810.19							41,810.19
517	Signals and Interlocking Apparatus	2,341.65							2,341.65
518	Telephone and Telegraph Lines	162.49							162.49
519	Poles and Fixtures	251,663.80					78.15	*78.15*	251,585.65
520	Underground Conduits	142,495.30							142,495.30
521	Distribution System	727,606.27	11,032.20			11,032.20	8,209.21	2,822.99	730,429.26
523	Shops and Carhouses	859,012.37							859,012.37
524	Stations, Miscellaneous Buildings and Structures	35,474.69							35,474.69
527	Cost of Road Purchased	44,154.47							44,154.47
529	Other Expenditures, Way and Structures	70,538.40	2,822.32			2,822.32	891.32	1,931.00	72,469.40
	Total Way and Structures	$6,927,704.14	$70,794.60	$ 250.58		$71,045.18	$36,479.39	$34,565.79	$6,962,269.93
Equipment:									
530A	Passenger and Combination Cars, Electric	$1,535,763.72							$1,535,763.72
530B	Passenger and Automotive Cars, Automotive	169,915.43							169,915.43
532A	Service Equipment, Electric	13,871.11							13,871.11
532B	Service Equipment, Automotive	29,662.31							29,662.31
533	Electric Equipment of Cars	764,013.64		$ 15.27		$ 15.27		$ 15.27	764,028.91
536	Shop Equipment	38,161.21	$ 466.42	673.01	$1,200.00*	2,339.43	$ 375.00	1,964.43	40,125.64
537	Furniture and Office Equipment	27,803.76	129.60	162.23		291.83	121.50	170.33	27,974.09
	Total Equipment	$2,579,191.18	$ 596.02	$ 850.51	$1,200.00	$ 2,646.53	$ 496.50	$ 2,150.03	$2,581,341.21
General and Miscellaneous:									
546	Law Expenditures	$ 13,889.66							$ 13,889.66
550	Miscellaneous	8,982.26							8,982.26
	Total General and Miscellaneous	$ 22,871.92							$ 22,871.92
	Total Road and Equipment	$9,529,767.24	$71,390.62	$1,101.09	$1,200.00	$73,691.71	$36,975.89	$36,715.82	$9,566,483.06

*Transferred from High Pressure System.
Italics denote Loss or Deficiency.

Schedule 2—Analysis Reserve for Depreciation as at June 30, 1932

	Provision for Depreciation				
Fiscal Year Ended	Total	Assets in Property Ledger	Track Roadway and Distributing System	Cost of Track Roadway and Distributing System	Resulting Rate of Depreciation on Track Roadway and Distributing System
1913	$ 24,291.63	$ 2,287.30	$ 22,004.33	$ 887,741.07	2.479%
1914	146,458.00	14,691.43	131,766.57	2,506,629.27	5.257%
1915	187,567.61	38,032.38	149,535.23	2,693,316.20	5.552%
1916	242,627.10	49,699.27	192,927.83	2,946,048.47	6.549%
1917	158,432.96	50,503.64	107,929.32	3,386,455.14	3.187%
1918	218,247.05	51,130.43	167,116.62	3,657,705.59	4.569%
1919	226,063.53	51,790.20	174,273.33	3,933,344.91	4.431%
1920	279,655.18	53,103.95	226,551.23	3,961,963.23	5.718%
1921	307,446.06	55,555.96	251,890.10	3,971,484.49	6.342%
1922	310,748.77	58,138.62	252,610.15	4,080,339.75	6.191%
1923	327,203.43	62,666.43	264,537.00	4,154,343.16	6.368%
1924	361,761.63	73,409.56	288,352.07	4,295,786.51	6.712%
1925	379,157.68	78,927.16	300,230.52	4,490,693.53	6.686%
1926	403,370.26	85,426.66	317,943.60	4,664,565.16	6.816%
1927	239,851.34	91,192.69	148,658.65	4,772,312.31	3.115%
1928	254,047.02	113,718.19	140,328.83	4,854,615.62	2.891%
1929	263,823.68	118,475.19	145,348.49	5,437,166.54	2.673%
1930	281,373.60	115,642.68	165,730.92	5,506,689.55	3.010%
1931	283,536.12	118,431.22	165,104.90	5,546,137.51	2.977%
1932	285,893.02	117,388.73	168,504.29	5,580,670.72	3.019%
	$5,181,555.67	$1,400,211.69	$3,781,343.98		

Total Provision as above		$5,181,555.67
Deduct: Charges to Reserve on Account of Assets Retired During Fiscal Years:		
Prior Years, Beginning Year of 1928-29	$182,227.40	
1931-32	28,940.71	211,168.11
Total Reserve as per Exhibit "A"		$4,970,387.56

Schedule 3—Statement of Operating Expenses by Primary Accounts as Prescribed by the Interstate Commerce Commission, for the Fiscal Year Ended June 30, 1932

Account Number	Description	Amount	Total
Way and Structures:			
1	Superintendence of Way and Structures	$ 5,120.23	
2	Ballast	75.82	
3	Ties	305.02	
4	Rails	1,353.89	
5	Rail Fastenings and Joints	2,730.93	
6	Special Work	1,290.30	
8	Track and Roadway Labor	67,335.80	
9	Miscellaneous Track and Roadway Expense	2,469.87	
10	Paving	20,315.10	
11	Cleaning and Sanding Track	30,407.11	
13	Tunnels and Subways	3,351.61	
16	Crossings, Fences and Signs	1,703.53	
17	Signal and Interlocking Apparatus	201.95	
18	Telephone and Telegraph Lines	17.75	
20	Poles and Fixtures	2,694.49	
22A	Overhead Feeders	*71.53*	
22B	Underground Feeders	10.10	
22C	Track Bonding	1,329.29	
22D	Overhead Trolleys	24,049.56	
23	Miscellaneous Electric Line Expense	8.44	
24C	Car Houses	1,001.32	
24D	Shops	18.85	
24E	General Offices	99.02	
24F	Station and Waiting Rooms and Platforms	602.56	
24H	Miscellaneous Buildings and Structures	237.57	
	Total Way and Structures		$ 166,658.58
Equipment:			
29	Superintendence of Equipment	$ 3,000.00	
30	Passenger and Combination Cars	126,065.41	
32	Service Equipment	313.85	
33	Electric Equipment of Cars	26,957.79	
36	Shop Equipment	229.17	
37	Shop Expenses	4,971.81	
38	Vehicles	1,619.19	
39A	Repairs to Motor Buses Owned	8,996.29	
39B	Painting Buses	1,154.23	
39C	Chassis Labor and Material, Buses	4,900.61	
39D	Bus Tires, Including Repairs	6,626.64	
39E	Bus Body Repairs	3,112.64	
39F	Bus Collision Expense	129.51	
39G	Transmission Labor and Materials, Buses	2,974.36	
39H	Brake Work, Buses	1,643.80	
	Total Equipment		$ 192,695.30

Schedule 3—Statement of Operating Expenses by Primary Accounts as Prescribed by the Interstate Commerce Commission, for the Fiscal Year Ended June 30, 1932

Account Number	Description	Amount	Total
Power:			
45	Superintendence of Power	$ 360.92	
47	Power Plant Equipment	239.95	
59	Power Purchased	491,809.22	
59A	Power Purchased for Lighting Car Barns	4,041.29	
59B	Power Purchased for Lighting Twin Peaks and Duboce Tunnels	1,489.62	
	Total Power		$ 497,941.00
Conducting Transportation:			
63	Superintendence of Transportation	$101,543.30	
64A	Conductors	779,648.45	
64B	Motormen	750,434.40	
66	Miscellaneous Car Service Employees	4,087.09	
67B	Lubricants and Waste	2,401.27	
67C	Special Agents and Fare Registers	3,471.55	
67D	Incandescent Lamps	2,358.58	
67E	Miscellaneous Car Service Expense	1,468.16	
68	Station Employees	11,617.04	
69	Station Expenses	1,943.48	
70	Car House Employees	149,055.00	
71	Car House Expenses	5,282.69	
73	Operation of Telephone and Telegraph Lines	4,777.23	
78	Miscellaneous Transportation Expense	976.13	
78A	Gasoline Buses	16,602.99	
78B	Oil Buses	1,723.60	
78C	Conductors and Chauffeurs, Buses	59,375.25	
78D	Greasing and Servicing, Buses	10,530.57	
78E	Cleaning and Washing, Buses	4,010.40	
	Total Conducting Transportation		$1,911,307.18
General and Miscellaneous:			
83	Salaries and Expenses, General Officers	$ 15,300.00	
84	Salaries and Expenses, General Office Clerks	21,278.50	
85	General Office Supplies and Expenses	4,886.21	
88	Pensions and Gratuities	98,019.83	
88A	Pension Costs, Buses	4,200.00	
89	Miscellaneous General Expense	15,078.62	
89A	Administration, Buses	9,600.00	
92D	Compensation Payments to Employees	15,639.55	
94	Stationery and Printing	4,047.32	
94A	Tickets and Transfers	7,756.50	
95	Store Expenses	8,758.65	
96	Garage and Stable Expenses	1,867.75	
97	Rent of Tracks and Terminals	11,645.19	
	Total General and Miscellaneous		$ 218,078.12
Transportation for Investment, Credit			*4,060.00*
	Total Operating Expenses		$2,982,620.18

Italics denote Loss or Deficiency.

(END—REPORT OF AUDIT 1931-1932)

Comparative Statement Data for Fiscal Years Ended June 30, 1932, and June 30, 1931

	Fiscal Year Ended June 30, 1932				Fiscal Year Ended June 30, 1931			
	Total	Ratio to Passenger Revenue	Per Car Mile	Per Car Hour	Total	Ratio to Passenger Revenue	Per Car Mile	Per Car Hour
Passenger Revenue	$3,163,188.68	100.000	.3237	3.1774	$3,409,103.00	100.000	.3370	3.2688
Operating Expenses	2,982,620.18	94.292	.3050	2.9960	3,190,580.58	93.590	.3154	3.0593
Interest on Funded Debt	120,718.33	3.816	.0123	.1213	130,218.34	3.819	.0129	.1249
Provision for Depreciation	285,893.02	9.038	.0293	.2872	283,536.12	8.317	.0280	.2719
Provision for Accidents	79,733.87	2.520	.0081	.0801	85,929.44	2.520	.0085	.0824
Taxes (Comparative Charge)	280,356.38	8.863	.0287	.2816	313,975.40	9.210	.0310	.3010
Fire Insurance (Comparative Charge)	5,835.84	.184	.0006	.0058	6,036.36	.177	.0006	.0058
Net Loss (See Exhibit "C")	*546,815.48*	*17.287*	*.0560*	*.5493*	*536,091.90*	*15.725*	*.0530*	*.5140*
Passenger Car and Bus Mileage	9,770,683				10,114,999			
Passenger Car and Bus Hours	995,523				1,042,925			
Platform Expense	$1,589,458.10	50.248	.1627	1.5966	$1,674,101.00	49.106	.1655	1.6052
Number of Passenger Cars Owned	234				234			
Number of Work Cars Owned	6				6			
Total Number of Cars Owned	240				240			
Total Number of Buses Owned	19				19			
Total Number of Cars and Buses Owned	259				259			
*Revenue Pasengers Carried	64,717,725		6.623	65.01	69,523,522		6.873	66.66
Free Transfer Passengers Carried	14,592,904		1.494	14.66	15,019,850		1.485	14.40
Free Passengers (Employes, Police, etc.)	812,609		.083	.81	707,370		.070	.68
Total Passengers Carried	80,123,238		8.200	80.48	85,250,742		8.428	81.74

Above includes Bus Operation.

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*Transfers received at Fillmore and Union Streets treated as revenue passengers pending result of present litigation with Market Street Railway Company.

Italics denote Loss or Deficiency.

Comparative Operating Receipt Statement Between Fiscal Years Ended June 30, 1932, and June 30, 1931, Respectively

Fiscal Year Ended June 30, 1932

Line	Receipts	Car Hours	Receipts Per Car Hour
A	$ 228,492.70	70,449	$3.24
B	391,990.35	105,243	3.72
C	280,160.70	89,839	3.12
D	225,105.75	66,672	3.38
E	175,439.85	76,174	2.30
F	283,295.60	62,575	4.53
H	205,341.25	82,392	2.49
J	257,454.95	74,456	3.46
K	298,405.65	93,178	3.20
L	276,835.20	88,471	3.13
M	8,876.55	9,667	.92
N	360,438.55	103,257	3.49
O	8,921.15	3,645	2.45
Total	$3,000,758.25	926,018	$3.24

Above receipts are for 5c fares only.

Total Receipts (Bus Lines not included) $3,014,114.35

Total Receipts per Car Hour (Bus Lines not included) 3.35

Bus Lines

Receipts	Bus Hours	Receipts Per Bus Hour
$96,263.40	69,506	$1.38

Total Bus and Car Hours.. 995,524

Total Receipts (all sources) $3,200,377.75

Total Receipts per Bus and Car Hour........ 3.21

Fiscal Year Ended June 30, 1931

Line	Receipts	Car Hours	Receipts Per Car Hour
A	$ 255,625.05	76,227	$3.35
B	432,358.35	112,557	3.84
C	306,309.35	96,534	3.17
D	250,198.95	70,478	3.55
E	197,475.05	79,578	2.48
F	306,723.75	66,628	4.60
H	224,501.10	85,944	2.61
J	291,004.40	82,054	3.55
K	315,688.35	98,307	3.21
L	285,506.60	90,056	3.17
M	9,595.80	9,638	1.00
N	374,496.65	105,646	3.54
Total	$3,249,483.40	973,647	$3.34

Above receipts are for 5c fares only.

Total Receipts (Bus Lines not included)........ $3,354,127.02

Total Receipts per Car Hour (Bus Lines not included) 3.44

Bus Lines

Receipts	Bus Hours	Receipts Per Bus Hour
$101,978.50	69,278	$1.47

Total Bus and Car Hours.. 1,042,925

Total Receipts (all sources) $3,456,105.52

Total Receipts per Bus and Car Hour........ 3.31

Comparison

Line	Receipts	Car Hours	Receipts Per Car Hour
A	*$ 27,132.35*	*5,778*	*$0.11*
B	*40,368.00*	*7,314*	*.12*
C	*26,148.65*	*6,695*	*.05*
D	*25,093.20*	*3,806*	*.17*
E	*22,035.20*	*3,404*	*.18*
F	*23,428.15*	*4,053*	*.07*
H	*19,159.85*	*3,552*	*.12*
J	*33,549.45*	*7,598*	*.09*
K	*17,282.70*	*5,129*	*.01*
L	*8,671.40*	*1,585*	*.04*
M	*719.25*	29	*.08*
N	*14,058.10*	*2,389*	*.05*
O	8,921.15	3,645	2.45
Total	*$248,725.15*	*47,629*	*$0.10*

Above receipts are for 5c fares only.

Total Receipts (Bus Lines not included) *$250,012.67*

Total Receipts per Car Hour (Bus Lines not included) *.09*

Bus Lines

Receipts	Bus Hours	Receipts Per Bus Hour
$5,715.10	228	*$0.09*

Total Bus and Car Hours.... *47,401*

Total Receipts (all sources) *$255,727.77*

Total Receipts per Bus and Car Hour .... *.10*

NOTE: Line "O" commenced operation on June 1, 1932, and was discontinued on July 15, 1932.

Italics denote Loss or Deficiency.

Cost Statement—Itemized Accounts

Car Operation, Fiscal Year July 1, 1931, to June 30, 1932

Account Number	Name	Amount	Per Car Mile	Per Car Hour
I.	**Way and Structures:**			
1	Superintendent, Way and Structures	$ 5,120.23	.00056	.00553
2	Ballast	75.82	.00001	.00008
3	Ties	305.02	.00004	.00033
4	Rails	1,353.89	.00015	.00146
5	Rail Fastenings and Joints	2,730.93	.00030	.00295
6	Special Work	1,290.30	.00014	.00139
8	Track and Roadway Labor	67,335.80	.00740	.07271
9	Misc. Track and Roadway Exp.	2,469.87	.00027	.00267
10	Paving	20,315.10	.00223	.02194
11	Cleaning and Sanding Tracks	30,407.11	.00334	.03284
13	Tunnels and Subways	3,351.61	.00037	.00362
16	Crossings, Fences, Guards, Signs	1,703.53	.00019	.00184
17	Signal and Interlocking Systems	201.95	.00002	.00022
18	Telephone and Telegragh System	17.75	.00000	.00002
20	Poles and Fixtures	2,694.49	.00030	.00291
22	Distributing System	25,317.42	.00278	.02734
23	Misc. Electric Line Exp.	8.44	.00000	.00001
24	Buildings, Fixtures and Grounds	1,959.32	.00022	.00211
	Total Way and Structures	$ 166,658.58	.01832	.17997
II.	**Equipment:**			
29	Superintendent of Equipment	$ 3,000.00	.00033	.00324
30	Passenger and Combined Cars	126,065.41	.01385	.13614
32	Service Equipment	313.85	.00003	.00034
33	Electric Equipment of Cars	26,957.79	.00296	.02911
36	Shop Equipment	229.17	.00003	.00025
37	Shop Expenses	4,971.81	.00055	.00537
38	Vehicles and Horses	1,619.19	.00018	.00175
	Credit Chgs. to Bus Line Opr.	*14.87*	*.00000*	*.00002*
	Total Equipment	$ 163,142.35	.01793	.17618
III.	**Power:**			
45	Superintendent of Power	$ 360.92	.00004	.00039
47	Power Plant Equipment	239.95	.00003	.00026
59	Power Purchased	497,340.13	.05466	.53707
	Total Power	$ 497,941.00	.05473	.53772

Italics denote Loss or Deficiency.

Account Number	Name		Amount	Per Car Mile	Per Car Hour
IV.	**Conducting Transportation:**				
63	Superintendent of Transportation		$ 101,543.30	.01116	.10966
64	Conductors, Motormen		1,530,082.85	.16817	1.65233
66	Miscellaneous Car Service Employees		4,087.09	.00045	.00441
67	Miscellaneous Car Service Expense		9,699.56	.00107	.01047
68	Station Employees		11,617.04	.00128	.01255
69	Station Expenses		1,943.48	.00021	.00210
70	Car House Employees		149,055.00	.01638	.16096
71	Car House Expenses		5,282.69	.00058	.00570
73	Opr. of Tel. and Tel. System		4,777.23	.00053	.00516
78	Other Transportation Expense		976.13	.00011	.00105
	Total Conducting Transportation		$1,819,064.37	.19994	1.96439
VI.	**General and Miscellaneous:**				
83	Salaries and Exp. Gen. Officers		$ 15,300.00	.00168	.01652
84	Salaries and Exp. Gen. Office Clerks		21,278.50	.00234	.02298
85	General Office Supplies and Exp.		4,886.21	.00054	.00528
88	Pensions and Gratuities		98,019.83	.01077	.10585
89	Miscellaneous General Expenses		15,078.62	.00166	.01628
92	Injuries and Damages (Employees)		15,639.55	.00172	.01689
94	Stationery and Printing		11,803.82	.00130	.01275
95	Store Expenses		8,758.65	.00096	.00946
96	Garage and Stable Expense		1,867.75	.00021	.00202
97	Rent of Tracks and Terminals		11,645.19	.00128	.01257
	Credit Chgs. to Bus Line Opr.		*9,795.36*	*.00108*	*.01058*
	Total General and Miscellaneous		$ 194,482.76	.02138	.21002
VII.	*Transportation for Inv. Cr.*		*$ 4,060.00*	*.00045*	*.00438*
	RECAPITULATION				
I.	Way and Structures		$ 166,658.58	.01832	.17997
II.	Equipment		163,142.35	.01793	.17618
III.	Power		497,941.00	.05473	.53772
IV.	Conducting Transportation		1,819,064.37	.19994	1.96439
VI.	General and Miscellaneous		194,482.76	.02138	.21002
VII.	*Transportation for Inv. Cr.*		*4,060.00*	*.00045*	*.00438*
	Total Recapitulation		$2,837,229.06	.31185	3.06390
	Depreciation Reserve	$285,893.02			
	(Less Applicable to Buses)	24,247.56	$ 261,645.46	.02875	.28255
	Accident Reserve	79,733.87			
	(Less Applicable to Buses)	16,139.98	63,593.89	.00699	.06867
	Grand Total		$3,162,468.41	.34759	3.41512
	Actual Payments and Accident Costs	$ 94,294.08			
	(Less Applicable to Buses)	2,804.97	$ 91,489.11		
	Car Mileage				9,098,184
	Car Hours				926,018

NOTE: Bus Line Operation not included.

Italics denote Loss or Deficiency.

Cost Statement—Itemized Accounts

Bus Operation, Fiscal Year July 1, 1931, to June 30, 1932

Account Number	Name	Amount	Per Bus Mile	Per Bus Hour
II.	**Equipment:**			
36	Shop Equipment, Machinery and Tools	$ 14.87	.00002	.00022
39A	Bus Engines, Labor and Material	8,996.29	.01338	.12943
39B	Painting Buses	1,154.23	.00172	.01661
39C	Chassis	4,900.61	.00729	.07051
39D	Bus Tires, Including Repairs	6,626.64	.00985	.09534
39E	Bus Body Repairs	3,112.64	.00463	.04478
39F	Repairs to Garage Equipment	129.51	.00019	.00186
39G	Transmission, Labor and Material	2,974.36	.00442	.04279
39H	Brake Work	1,643.80	.00244	.02365
	Total Equipment	$ 29,552.95	.04394	.42519
IV.	**Conducting Transportation:**			
78A	Gasoline, Buses	$ 16,602.99	.02469	.23887
78B	Oil, Buses	1,723.60	.00256	.02480
78C	Conductor-Chauffeurs, Buses	59,375.25	.08829	.85424
78D	Greasing and Servicing Buses	10,530.57	.01566	.15151
78E	Cleaning and Washing Buses	4,010.40	.00596	.05770
	Total Conducting Transportation	$ 92,242.81	.13716	1.32712
VI.	**General and Miscellaneous:**			
88A	Pension Costs, Buses	$ 4,200.00	.00624	.06043
89A	Administration, Buses	9,600.00	.01428	.13812
94	Stationery and Printing	300.00	.00045	.00431
95	Store Expense	3,201.36	.00476	.04606
98	Rent of Equipment	3,294.00	.00490	.04739
98A	Garage Rental, Buses	3,000.00	.00446	.04316
	Total General and Miscellaneous	$ 23,595.36	.03509	.33947

RECAPITULATION OF COST STATEMENT

Buses

Account Number	Name	Amount	Per Bus Mile	Per Bus Hour
II.	Equipment	$ 29,552.95	.04394	.42519
IV.	Conducting Transportation	92,242.81	.13716	1.32712
VI.	General and Miscellaneous Expense	23,595.36	.03509	.33947
	Total	$145,391.12	.21619	2.09178
Injuries and Damages (Reserves)		$ 16,139.98	.02400	.23221
Depreciation		24,247.56	.03606	.34885
	Total Opr. Expenses and Reserves	$185,778.66	.27625	2.67284
Interest on Investment		7,634.87	.01135	.10985
	Total Bus Costs	$193,413.53	.28760	2.78269

Bus Mileage 672,499

Bus Hours 69,506

REPORT OF AUDIT—1932-1933

November 24, 1933.

Mr. Leonard S. Leavy, Comptroller,
City and County of San Francisco,
San Francisco, California.

Dear Sir:

We have examined the books and accounts of the Municipal Railway of the City and County of San Francisco for the Fiscal year ended June 30, 1933, and submit herewith our report, together with the following statements:

Exhibit "A"—Comparative General Balance Sheet as at June 30, 1933, and June 30, 1932.

Exhibit "B"—Comparative Statement of Monthly Income for the Fiscal Year Ended June 30, 1933.

Exhibit "C"—Comparative Statement of Income for the Period December 28, 1912, to June 30, 1933.

Exhibit "D"—Fund Balance Sheet as at June 30, 1933.

Exhibit "E"—Statement of Budget and Actual Receipts and Expenditures for the Fiscal Year Ended June 30, 1933.

Exhibit "F"—Statement of Bus Line Operations for the Fiscal Year Ended June 30, 1933.

Schedule 1—Schedule of Road and Equipment as at June 30, 1933.

Schedule 2—Analysis of Reserve for Depreciation as at June 30, 1933.

Schedule 3—Statement of Operating Expenses by Primary Accounts as Prescribed by the Interstate Commerce Commission for the Fiscal Year Ended June 30, 1933.

We hereby certify that the attached comparative general balance sheet and statement of income, subject to the comments contained in this report, correctly exhibit, respectively, the financial condition of the Municipal Railway of San Francisco as at June 30, 1933, and the result of operations for the fiscal year ended that date.

Respectfully submitted,

F. W. LAFRENTZ & CO.,
BULLOCK, KELLOGG & MITCHELL,
Certified Public Accountants.

General Balance Sheet—Exhibit "A"

Road and Equipment—$9,566,686.48

An analysis of this amount is given in Schedule 1, which also reflects the additions and retirements for the fiscal year under review. These latter transactions were investigated by us and no exceptions were noted. In accordance with Ordinance No. 8570, N. S., provision has been made for depreciation in the amount of $286,994.49 during the current year.

General Expenditures—$324,872.84

The items included in this amount are shown as follows:

Interest on Funded Debt During Construction	$252,270.75
Cost of Elections	57,092.91
Legal Expense	12,778.65
Miscellaneous	2,730.53
	$324,872.84

CASH WITH TREASURER

Municipal Railway Bond Redemption Fund—$119,319.79

Municipal Railway Bond Interest Fund—$30,526.39

The funds stated hereunder are maintained by transfer from the General Fund of the City and County of San Francisco to meet principal maturities and bond interest as they become due.

Bond Redemption:

Geary Street Issue of 1910	$103,516.62
Market Street Issue of 1910	6,538.00
Municipal Railway Issue of 1913	9,265.17
	$119,319.79

Bond Interest:

Geary Street Issue of 1910	$ 5,935.05
Market Street Issue of 1910	361.05
Municipal Railway Issue of 1913	24,230.29
	$ 30,526.39

Municipal Railway Operating Fund—$339,217.88

Accident Reserve Fund—$6,881.50

Depreciation Reserve Fund—$318,070.43

These fund balances were reconciled with the records of the Treasurer of the City and County of San Francisco.

With reference to the Accident Reserve Fund, it will be observed that the offsetting reserve on the liability side of the balance sheet indicates a balance of $2,961.28. The difference, $3,920.22, is due the Municipal Railway Operating Fund, which is clearly reflected by the fund balance sheet, Exhibit "D."

Miscellaneous and Accounts Receivable—$13,584.60

This balance consists of the following receivable items:

Board of State Harbor Commissioners	$10,372.12
Pacific Gas and Electric Company	764.00
Crab Fishermen's Protective Association	50.00
Department of Public Works, City and County of San Francisco	70.00
General Fund, City and County of San Francisco	2,328.48
	$13,584.60

The amount receivable from the Board of State Harbor Commissioners represents the loss incurred in the operation of the Embarcadero Bus Line for the current fiscal year, as reflected by Exhibit "E." The board has agreed to indemnify the City and County of San Francisco for loss sustained in the operation of that line.

The Pacific Gas and Electric Company item covers pole rentals for the six months ended June 30, 1933, and the amount due from Crab Fishermen's Protective Association represents lot rental for the month of June, 1933.

In consonance with Ordinance 8570, N. S., Municipal Railway funds are deposited with the Treasurer. Interest in the amount of $2,328.48 has accrued on these deposits and is shown as due from the general fund.

Payment of all of the amounts referred to under this caption was received subsequent to June 30, 1933.

Materials and Supplies—$168,032.61

This balance reflects the cost of materials and supplies on hand June 30, 1933, distributed as under:

Pipe Yard, Sixth and Hubbell Streets	$106,579.18
Car Barn, Geary Street	61,453.43
	$168,032.61

We made an actual physical count of a number of items at the Geary Street Car Barn and found in each case the count agreed with the stock card record. In addition, a number of the remaining stock cards were checked with the inventory to ascertain if they were in agreement. No exceptions were noted. The prices, extensions, and footings of the inventory sheets were checked, and in our opinion, the quantities and values reported are correct.

Managers' Contingent Fund—$4,000.00

This fund is maintained for payment of accident claims and expenses in connection with special investigations. It is in the custody of the following officers:

Mr. Fred Boeken, Manager	$ 700.00
Mr. T. B. Johnson, Claims Agent	3,300.00
	$4,000.00

Due to the absence of Mr. Boeken at the time of our examination, we were unable to count the cash on hand included in the $700.00 fund. However, a certification was received from the bank showing a balance of $573.58 in the fund on October 31, 1933.

The claims agent fund was reconciled with the certification obtained from the depository, and the releases signed by the plaintiffs, whereby the Municipal Railway was relieved from any further liability in the various actions, were thoroughly test checked.

Due from General Fund, City and County of San Francisco

The items totaling $82,123.73 reflected on the June 30, 1932, balance sheet under this capition were offset during the current fiscal year against the current advances for operating purposes from the general fund.

Replacement Jobs in Process—$4,357.54

This consists of the cost to date of three jobs which, when completed, will be charged to Road and Equipment.

Rent of Road Paid in Advance

The cost of acquiring the right to operate Municipal Railway cars over Ocean Avenue, between Mission Street and Junipero Serra Boulevard, and over a private right of way from Ocean Avenue to Sloat Boulevard, has now been fully amortized. The original cost of this privilege in December, 1918, was $100,000.00.

Miscellaneous Unadjusted Debits—$626.67

The items contained in this account are as follows:

Bond Interest Coupons Paid in Advance	$ 45.00
Rental of Rail Preheater under Option to Purchase	581.67
	$626.67

Funded Debt Unmatured—$2,202,000.00

The following is a recapitulation of issues of the unmatured funded debt. Of the amounts shown, $95,000.00 of the Geary Street issue and $6,000.00 of the Market Street issue matured July 1, 1933.

Issue	Total Issue	Matured 1932-33	Unmatured June 30, 1933	Date of Final Maturity
Geary Street, 4½%, 1910	$1,900,000.00	$ 95,000.00	$ 190,000.00	7-1-34
Market Street, 4½%, 1910	81,000.00	6,000.00	12,000.00	7-1-34
Municipal Railway, 5%, 1913	3,500,000.00	100,000.00	2,000,000.00	12-1-52
	$5,481,000.00	$201,000.00	$2,202,000.00	

We did not examine the matured bonds paid by the Treasurer during the fiscal year 1932-33. We were advised that these had been checked in by the auditing staff of the City Comptroller's office.

Audited Accounts and Wages Payable—$88,748.94

These represent unpaid demands at June 30, 1933, which were reconciled with the records of the City Comptroller.

Miscellaneous Accounts Payable—$63,945.79

This liability consists of certain current expenditures which had not been vouched by the City Comptroller as at June 30, 1933. All of the items included had been cleared at the time of our examination.

Matured Interest on Funded Debt—$16,050.00

Interest coupons matured but unpaid at June 30, 1933, are represented by this amount. They consist of the following:

Geary Street Issue of 1910	$ 562.50
Market Street Issue of 1910	22.50
Municipal Railway Issue of 1913	15,465.00
	$16,050.00

Due to the manner in which paid coupons were filed, we were unable to verify coupons redeemed during the year. The internal check existing between the offices of the Treasurer and Comptroller furnishes an inter-office audit of these transactions.

Matured Funded Debt—$300.00

Bonds in the amount of $300.00 of the Municipal Railway Issue of 1913 had matured prior to June 30, 1933, but were unpaid on that date.

Accrued Interest on Funded Debt—$12,878.33

This accrual represents the interest to June 30, 1933, not yet due, on the following issues:

Geary Street Issue of 1910, Due July 1, 1933	$ 4,275.00
Market Street Issue of 1910, Due July 1, 1933	270.00
Municipal Railway Issue of 1913, Due Dec. 1, 1933	8,333.33
	$12,878.33

It will be observed that the first two items became due July 1, 1933.

Reserve for Accidents—$2,961.28

The following is an analysis of this account for the current fiscal year:

Balance, June 30, 1932		*$ 9,678.71*
Additions to Reserve, 2½% of Gross Revenue in Accordance with Ordinance No. 8570, N. S.		70,515.00
		$60,836.29
Less: Claims Paid, Chargeable to the Reserve	$54,875.01	
Legal Expense	3,000.00	57,875.01
Balance, June 30, 1933		$ 2,961.28

The balance at June 30, 1933, is represented by cash as follows:

Accident Reserve Fund Cash	$ 6,881.50
Due Municipal Railway Operating Fund	3,920.22
Balance of Cash	$ 2,961.28

While the foregoing analysis shows a small balance on June 30, 1933, charges made against the reserve for claims paid subsequent to that date have again depleted the reserve to a deficit of *$5,403.90* on September 30, 1933.

From the foregoing it is apparent that the provisions for accidents, authorized under Ordinance No. 7060, N. S., and subsequently under Ordinance No. 8570, N. S., have proved inadequate to meet the claim liability. The following shows the transactions affecting the reserve from year to year:

Year	Provision by Charge to Operations	Other Credits	Claims Paid	Reserve Account Balance
May 1, 1926—Transferred from Old Depreciation Fund		$100,000.00		$100,000.00
May 1 to June 30, 1926	$ 14,066.28		$ 9,457.00	104,609.28
1926-27	84,954.69	*15.05*	72,774.20	116,774.72
1927-28	86,546.56	157.21	123,181.59	80,296.90
1928-29	87,053.33		105,893.63	61,456.60
1929-30	89,224.43		103,384.68	47,296.35
1930-31	85,929.44		126,344.29	6,881.50
1931-32	79,733.87		96,294.08	*9,678.71*
1932-33	70,515.00	*3,000.00*	54,875.01	2,961.28
	$598,023.60	$ 97,142.16	$692,204.48	

It will be observed that the reserve shows a declining balance which it would appear should be built up instead of being allowed to decline, although from a long term viewpoint statistics indicate that over the entire period of operations losses have been less than the 2½% now set aside.

Italics denote Loss or Deficiency.

Reserve for Accrued Depreciation, Road and Equipment—$5,244,286.69

Provision for depreciation during the period under review has been made at the rate of 3% of all road and equipment properties, in accordance with Ordinance No. 8570, N. S. Schedule 2 of this report gives an analysis of the reserve account and shows the application of the above rate to the different types of assets as follows:

Depreciation on Equipment and Certain Other Assets in Property Ledger at Rates Based on the Life of Specific Types of Property	$106,494.73
Balance of Provision for Depreciation Applicable to Track, Roadway, and Distributing System	180,499.76
Total Provision Being 3% of All Properties	$286,994.49
Resulting Rate of Depreciation on Track, Roadway and Distributing System	3.235%

Ordinances Nos. 7060 and 8570, N. S., call for the transfer of cash to the depreciation fund in a certain specified manner. Due, however, to lack of cash in the operating fund, compliance with this provision could not be made for the current and prior years as follows:

Year			
1927-28			$ 36,684.20
1928-29			263,823.68
1929-30			281,373.60
1930-31			175,821.65
1931-32			233,021.06
1932-33 Total Provision per Schedule 2		$286,994.49	
Less: Expended from Operating Fund for Repairs and Construction	$20,144.59		
Amount Transferred from Municipal Railway Operating Fund per 1932-33 Budget	71,460.00	91,604.59	195,389.90
Total Due from Operating Fund			$1,186,114.09

In addition to the delay in the accumulation of cash in the fund account, there were certain applications made of the funds provided for the depreciation accounts, consideration of which is necessary in order to reconcile the depreciation reserve fund with the depreciation reserve. An analysis is as follows:

Provision for Depreciation as per Schedule 2 of this Report		$5,468,550.16
Retirements, Years 1921 to 1928 Not Shown on Schedule		115,472.34
Add: Provision for Redemption of Bonded Debt Added to Reserve, Fiscal Years 1913-26	$2,029,666.67	
Interest, and Profit on Sale of Securities Credited to Income and Included in Surplus	496,911.82	
Cancelled Warrants	43.89	
Transfers from Other Funds	21,722.46	2,548,344.84
		$8,132,367.34
Deduct: Cash on Hand	$ 318,070.43	
Due from Operating Fund, as Shown Above	1,186,114.09	1,504,184.52
Total Cash to Be Accounted for		$6,628,182.82

Accounted for as follows:

Payments for Injuries and Damage Claims	$ 571,963.75
Bonds Redeemed and Interest Paid	2,056,616.90
Advanced to Operating Fund for Twin Peaks Tunnel	82,152.53
Transferred to Operating Fund for Wage Increases, etc.	717,354.43
Expended for Extensions, Betterments and Replacements	3,200,095.21
	$6,628,182.82

In the audit report rendered for the previous year a set-up of the depreciation account was given which reflected the effect upon this account and upon surplus of all the transactions involving the depreciation reserve fund. We believe that consideration should be given to reflecting such set-up upon the books and in reports.

Surplus—$3,265,005.70

Surplus has been classified in Exhibit "A" under three main groups, as shown hereunder:

Contributed Surplus—$1,434,483.57

General Taxes—$1,384,483.19

Net contributions as above from the General Fund of the City and County of San Francisco are made up as follows:

Interest on Bonded Debt, 1910-15		$ 239,901.83
Cost of Bond Elections, 1909-13		29,628.54
Contributory Services of Employees		37,022.10
West Portal Avenue Improvement		15,180.21
Street Improvement, St. Francis Circle		18,551.41
Crane Transferred from High Pressure System		1,200.00
Bond Interest and Redemption, and Operating Expenses, Years 1930 to 1933		1,125,122.83
		$1,466,606.92
Less: Advances to the General Ledger Charged Off:		
Twin Peaks Tunnel	$32,152.53	
Stockton Street Tunnel	48,971.20	
Ocean Shore Railway Switching	1,000.00	82,123.73
Net Contribution from General Fund		$1,384,483.19

Premium on Bonds Sold—$26,000.38

Premiums on bonds sold in the years 1913 and 1914 were added to surplus because of the small effect that would result if credited to operations during any one year.

Donated Equipment—$24,000.00

This represents the value of three Pierce-Arrow buses donated by the residents of Westwood Park.

Provision for Comparative Charges—$5,105,773.02

Taxes—$5,001,396.98

The provisions of the Charter of the City and County of San Francisco require the reports of the Municipal Railway to reflect the charges for taxes and insurance which would have to be paid if the railway were privately operated. The following charges have, therefore, been made to operations and are reflected in surplus as hereunder:

Taxes of the State of California	$2,837,799.48
Franchise Taxes of the City and County of San Francisco	2,066,152.49
Car Licenses	59,748.75
Federal Income Tax	37,696.26
	$2,880,460.68

Insurance—$104,376.04

In accordance with the Charter, as referred to above, fire insurance charges have been included and are based on a rate of $0.40 per $100.00 of valuation of street cars and buses.

Deficit Arising from Operations—$3,275,250.89

An analysis of the results of operations for the fiscal year ended June 30, 1933, is given in Exhibit "B," and in Exhibit "C" will be found a comparative analysis of operations since the inception of the railway in 1912.

Net Surplus—$3,265,005.70

Changes in the surplus for the year have been as follows:

Balance, June 30, 1932, as per Report		$3,231,907.15
Deduct: Net Loss from Operations for the Year Ended June 30, 1933, Before Comparison Charges		351,446.47
		$2,880,460.68
Add: Contributions from General Taxes, Bond Interest and Redemptions, 1932-33		466,668.75
		$3,347,129.43
Deduct: Prior Year Advances to General Fund Charged Off:		
Twin Peaks Tunnel	$32,152.53	
Stockton Street Tunnel	48,971.20	
Ocean Shore Railway Switching	1,000.00	82,123.73
Net Surplus, June 30, 1933		$3,265,005.70

Comparative Statement of Monthly Income—Exhibit "B"

This exhibit shows the results of operations for the year 1932-33 analyzed according to months. The effect of the salary and wage cuts in reducing operating expenses will be noticed for the months of May and June.

Fund Balance Sheet—Exhibit "D"

As already referred to in a previous report, this statement shows the delay in transferring funds from the Operating Fund to the Depreciation Fund. This has resulted in an amount of $1,186,114.09 being due from the former fund at June 30, 1933.

Included as a resource of the Operating Fund is an amount of $22,698.75 which is shown as due from the Bond Interest and Redemption Fund. This amount was placed in the latter fund from the apportionment of personal property taxes, and as the regular transfers from Operating to Bond Interest and Redemption Fund have been made during the year to take care of actual requirements, an excess transfer resulted. Adjustment will be made during the current fiscal year by reducing the amount of transfers to the Bond Interest and Redemption Fund.

Statement of Budget and Actual Receipts and Expenditures

Exhibit "E"

Analyzed in this statement is the 1932-33 budget showing a comparison with actual receipts and expenditures. This statement indicates that receipts did not come up to the estimate, chiefly due to a falling off of operating revenues. The decline was more than offset by reductions in expenditures, so that the net savings over the budget estimate amounted to $122,253.00.

The expenditure for replacements of $91,604.00 includes the amount of $71,460.00 placed in the Depreciation Fund, and an amount of $20,144.59 expended from the Operating Fund.

General

The accounts of the Municipal Railway are kept in the manner prescribed by the Interstate Commerce Commission, and they are maintained in excellent condition.

During the course of audit full co-operation and assistance was given by the expert of the Grand Jury of the City and County of San Francisco, for which we wish to express our appreciation.

Exhibit "A"—Comparative General Balance Sheet as of June 30, 1933, and June 30, 1932

ASSETS

	June 30, 1933	June 30, 1932	Increase *Decrease*
Road and Equipment (Schedule 1)	$9,566,686.48	$9,566,483.06	$ 203.42
General Expenditures	324,872.84	324,872.84	
Total Property Investment	$9,891,559.32	$9,891,355.90	$ 203.42
Current Assets:			
Cash with Treasurer:			
Municipal Railway Bond Redemption Fund	$ 119,319.79	$ 106,508.72	$ 12,811.07
Municipal Railway Bond Interest Fund	30,526.39	25,910.36	4,616.03
Municipal Railway Operat'g Fund	339,217.88	289,814.51	49,403.37
Accident Reserve Fund	6,881.50	6,881.50	
Depreciation Reserve Fund	318,070.43	246,610.43	71,460.00
Miscellaneous Accounts Receivable	13,584.60	11,631.56	1,953.04
Materials and Supplies	168,032.61	171,436.98	*3,404.37*
Managers' Contingent Fund	4,000.00	4,000.00	
Total Current Assets	$ 999,633.20	$ 862,794.06	$136,839.14
Unadjusted Debits:			
Due from General Fund, City and County of San Francisco:			
Advance on Twin Peaks Tunnel		$ 32,152.53	*$ 32,152.53*
Advance on Stockton St. Tunnel		48,971.20	*48,971.20*
Advance on Ocean Shore Railroad Switching		1,000.00	*1,000.00*
Total Due from City		$ 82,123.73	*$ 82,123.73*
Replacement Jobs in Process	$ 4,357.54		4,357.54
Rent of Road Paid in Advance		5,169.56	*5,169.56*
Miscellaneous Unadjusted Debits	626.67		626.67
Total Unadjusted Debits	$ 4,984.21	$ 87,293.29	*$ 82,309.08*
	$10,896,176.73	$10,841,443.25	$ 54,733.48

Italics denote Loss or Deficiency.

LIABILITIES AND SURPLUS

	June 30, 1933	June 30, 1932	Increase *Decrease*
Funded Debt, Unmatured	$ 2,202,000.00	$ 2,403,000.00	*$201,000.00*
Current Liabilities:			
Audited Accounts and Wages Payable	$ 88,748.94	$ 114,598.00	*$ 25,849.06*
Miscellaneous Accounts Payable	63,945.79	96,744.25	*32,798.46*
Matured Interest on Funded Debt	16,050.00	17,017.50	*967.50*
Matured Funded Debt	300.00	1,900.00	*1,600.00*
Accrued Interest on Funded Debt, Not Due	12,878.33	15,567.50	*2,689.17*
Total Current Liabilities	$ 181,923.06	$ 245,827.25	*$ 63,904.19*
Reserve for Accidents	$ 2,961.28	*$ 9,678.71*	$ 12,639.99
Reserve for Accrued Depreciation, Road and Equipment (Sched. 2)	5,244,286.69	4,970,387.56	273,899.13
Total Reserves	$5,247,247.97	$4,960,708.85	$286,539.12
Surplus:			
Contributed:			
General Taxes	$1,384,483.19	$ 999,938.17	$384,545.02
Premium on Bonds Sold	26,000.38	26,000.38	....
Donated Equipment	24,000.00	24,000.00	....
Total Contributed Surplus	$1,434,483.57	$1,049,938.55	$384,545.02
Provision for Comparative Charges:			
Taxes	$5,001,396.98	$4,749,796.75	$251,600.23
Insurance	104,376.04	98,853.11	5,522.93
Total Provision for Comparative Charges	$5,105,773.02	$4,848,649.86	$257,123.16
Surplus from Operations (Exhibit "C")	*3,275,250.89*	*2,666,681.26*	*608,569.63*
Total Net Surplus	$3,265,005.70	$3,231,907.15	$ 33,098.55
	$10,896,176.73	$10,841,443.25	$ 54,733.48

Italics denote Loss or Deficiency.

Exhibit B—Comparative Statement of Monthly Income for the Fiscal Year Ended June 30, 1933

	Total	July 1932	August 1932	September 1932	October 1932	November 1932	December 1932	January 1933	February 1933	March 1933	April 1933	May 1933	June 1933
Operating Revenues:													
Passenger Revenue	$2,795,455.72	$235,619.35	$246,385.90	$238,379.50	$248,495.40	$233,108.30	$237,701.62	$225,676.95	$214,351.45	$232,045.90	$229,878.15	$232,723.50	$221,089.70
Miscellaneous Operating Revenue	25,144.36	2,035.50	2,031.30	2,029.17	2,029.17	2,032.52	2,810.17	1,913.47	1,873.10	1,837.25	1,952.35	1,853.85	2,746.51
Total Operating Revenue	$2,820,600.08	$237,654.85	$248,417.20	$240,408.67	$250,524.57	$235,140.82	$240,511.79	$227,590.42	$216,224.55	$233,883.15	$231,830.50	$234,577.35	$223,836.21
Operating Expense:													
Way and Structures	$ 150,424.73	$ 11,820.12	$ 13,736.77	$ 15,281.46	$ 13,563.84	$ 12,327.08	$ 11,351.28	$ 11,792.78	$ 10,686.39	$ 13,681.55	$ 12,325.31	$ 11,504.19	$ 12,353.96
Equipment	178,598.19	14,305.83	15,961.37	15,216.43	15,024.37	14,630.40	15,345.62	14,735.21	13,978.72	16,546.45	14,863.18	14,106.58	13,884.03
Power	475,018.59	40,229.85	41,327.87	39,702.53	40,787.33	39,472.73	40,351.85	39,913.10	36,731.12	39,975.75	38,757.83	39,799.58	37,969.05
Conducting Transportation	1,725,037.79	154,252.75	154,865.00	146,067.75	148,725.27	143,234.48	145,788.54	145,338.14	133,139.72	146,118.66	142,252.05	133,784.72	131,470.71
General and Miscellaneous	195,357.57	17,430.40	16,953.26	17,405.31	16,644.66	17,390.36	18,131.02	16,659.93	15,136.43	16,596.32	14,485.74	14,164.76	14,359.38
Transportation for Investment	*921.50*	*118.50*	*42.50*	*60.00*	*43.50*	*86.00*	*87.00*	*57.50*	*85.00*	*144.00*	*5.00*	*25.00*	*167.50*
Total Operating Expense	$2,723,515.37	$237,920.45	$242,801.77	$233,613.48	$234,701.97	$226,969.05	$230,881.31	$228,381.66	$209,587.38	$232,774.73	$222,679.11	$213,334.83	$209,869.63
Profit from Operations	$ 97,084.71	*$ 265.60*	$ 5,615.43	$ 6,795.19	$ 15,822.60	$ 8,171.77	$ 9,630.48	*$ 791.24*	$ 6,637.17	$ 1,108.42	$ 9,151.39	$ 21,242.52	$ 13,966.58
Deduct Provision for:													
Depreciation	$ 286,994.49	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.21	$ 23,916.18
Accidents	70,515.00	5,941.37	6,210.43	6,010.22	6,263.11	5,878.52	6,012.79	5,689.76	5,405.62	5,847.08	5,795.76	5,864.44	5,595.90
Total Deductions	$ 357,509.49	$ 29,857.58	$ 30,126.64	$ 29,926.43	$ 30,179.32	$ 29,794.73	$ 29,929.00	$ 29,605.97	$ 29,321.83	$ 29,763.29	$ 29,711.97	$ 29,780.65	$ 29,512.08
Income from Operations	*$ 260,424.78*	*$ 30,123.18*	*$ 24,511.21*	*$ 23,131.24*	*$ 14,356.72*	*$ 21,622.96*	*$ 20,298.52*	*$ 30,397.21*	*$ 22,684.66*	*$ 28,654.87*	*$ 20,560.58*	*$ 8,538.13*	*$ 15,545.50*
Non Operating Income:													
Subsidy from Harbor Bus Line	$ 10,372.12	$ 1,003.59	$ 1,075.84	$ 884.70	$ 878.81	$ 850.00	$ 941.40	$ 1,004.82	$ 899.92	$ 603.53	$ 907.81	$ 689.87	$ 631.83
Interest on Bank Balances	9,241.04			2,303.22			2,500.00			2,109.34			2,328.48
Miscellaneous Credits	538.48	.20				295.81						30.00	212.47
Total Non Operating Income	$ 20,151.64	$ 1,003.79	$ 1,075.84	$ 3,187.92	$ 878.81	$ 1,145.81	$ 3,441.40	$ 1,004.82	$ 899.92	$ 2,712.87	$ 907.81	$ 719.87	$ 3,172.78
Gross Income	*$ 240,273.14*	*$ 29,119.39*	*$ 23,435.37*	*$ 19,943.32*	*$ 13,477.91*	*$ 20,477.15*	*$ 16,857.12*	*$ 29,392.39*	*$ 21,784.74*	*$ 25,942.00*	*$ 19,652.77*	*$ 7,818.26*	*$ 12,372.72*
Deductions from Gross Income:													
Interest on Funded Debt	$ 111,173.33	$ 9,507.50	$ 9,507.50	$ 9,507.50	$ 9,507.50	$ 9,507.50	$ 9,090.83	$ 9,090.83	$ 9,090.84	$ 9,090.83	$ 9,090.83	$ 9,090.84	$ 9,090.83
Net Income before Comparative Charges	*$ 351,446.47*	*$ 38,626.89*	*$ 32,942.87*	*$ 29,450.82*	*$ 22,985.41*	*$ 29,984.65*	*$ 25,947.95*	*$ 38,483.22*	*$ 30,875.58*	*$ 35,032.83*	*$ 28,743.60*	*$ 16,909.10*	*$ 21,463.55*
Deduct Charter Comparative Charges:													
Taxes Assignable	$ 251,600.23	$ 20,879.10	$ 21,975.76	$ 21,388.24	$ 22,277.13	$ 20,915.53	$ 21,343.26	$ 20,272.55	$ 19,462.18	$ 21,048.14	$ 20,844.70	$ 21,100.13	$ 20,093.51
Fire Insurance	5,522.93	460.24	460.24	460.24	460.24	460.24	460.24	460.24	460.24	460.24	460.24	460.24	460.29
Total Comparative Charges	$ 257,123.16	$ 21,339.34	$ 22,436.00	$ 21,848.48	$ 22,737.37	$ 21,375.77	$ 21,803.50	$ 20,732.79	$ 19,922.42	$ 21,508.38	$ 21,304.94	$ 21,560.37	$ 20,553.80
Profit and Loss Balance	*$ 608,569.63*	*$ 59,966.23*	*$ 55,378.87*	*$ 51,299.30*	*$ 45,722.78*	*$ 51,360.42*	*$ 47,751.45*	*$ 59,216.01*	*$ 50,798.00*	*$ 56,541.21*	*$ 50,048.54*	*$ 38,469.47*	*$ 42,017.35*

Italics denote Loss or Deficiency.

Exhibit "C"—Comparative Statement of Income for the Period December 28, 1912, to June 30, 1933

	Period Dec. 28, 1912 to June 30, 1932		Period July 1, 1931 to June 30, 1932		Period July 1, 1932 to June 30, 1933		Period Dec. 28, 1912 to June 30, 1933	
	Amount	Per Cent of Passenger Revenue	Amount	Per Cent of Passenger Revenue	Amount	Per Cent of Passenger Revenue	Amount	Per Cent of Passenger Revenue
Passenger Revenue	$52,547,585.26	100.000	$3,163,188.68	100.000	$2,795,455.72	100.000	$55,343,040.98	100.000
Miscellaneous Revenue	260,120.99	......	26,166.26	......	25,144.36	......	285,265.35	......
Total Revenue	$52,807,706.25	......	$3,189,354.94	......	$2,820,600.08	......	$55,628,306.33	......
Operating Expenses:								
Way and Structures	$ 2,002,852.74	3.811	$ 166,658.58	5.269	$ 150,424.73	5.381	$ 2,153,277.47	3.891
Equipment	3,234,221.24	6.155	192,695.30	6.092	178,598.19	6.389	3,412,819.43	6.167
Power	7,475,729.34	14.226	497,941.00	15.742	475,018.59	16.993	7,950,747.93	14.366
Conducting Transportation	26,000,808.54	49.481	1,911,307.18	60.423	1,725,037.79	61.709	27,725,846.33	50.098
Traffic	4,576.70	.009	......	......	......	......	4,576.70	.008
General and Miscellaneous	2,666,408.61	5.074	218,078.12	6.894	195,357.57	6.988	2,861,766.18	5.171
Transportation for Investment	*14,758.00*	.028	*4,060.00*	*.128*	*921.50*	*.033*	*15,679.50*	*.028*
Total Operating Expense	$41,369,839.17	78.728	$2,982,620.18	94.292	$2,723,515.37	97.427	$44,093,354.54	79.673
Profit from Operations	$11,437,867.08	21.767	$ 206,734.76	6.536	$ 97,084.71	3.473	$11,534,951.79	20.843
Deduct Provision for:								
Depreciation	$ 5,297,028.01	10.081	$ 285,893.02	9.038	$ 286,994.49	10.266	$ 5,584,022.50	10.090
Accidents	1,099,472.35	2.092	79,733.87	2.521	70,515.00	2.522	1,169,987.35	2.114
Total Deductions	$ 6,396,500.36	12.173	$ 365,626.89	11.559	$ 357,509.49	12.788	$ 6,754,009.85	12.204
Income from Operations	$ 5,041,366.72	9.594	*$ 158,892.13*	*5.023*	*$ 260,424.78*	*9.315*	$ 4,780,941.94	8.639
Non-Operating Income:								
Income from Sinking Fund and Other Reserves	$ 596,895.75	1.136	......	......	......	......	$ 596,895.75	1.079
Subsidy from Harbor Bus Line	43,047.81	.082	$ 10,452.38	.330	$ 10,372.12	.371	53,419.93	.097
Interest on Bank Balances	15,610.64	.029	8,275.30	.262	9,241.04	.331	24,851.68	.045
Miscellaneous Credits	171,658.04	.327	259.52	.008	538.48	.019	172,196.52	.311
Total Non-Operating Income	$ 827,212.24	1.574	$ 18,987.20	.600	$ 20,151.64	.721	$ 847,363.88	1.532
Gross Income	$ 5,868,578.96	11.168	*$ 139,904.93*	*4.423*	*$ 240,273.14*	*8.594*	$ 5,628,305.82	10.171
Deductions from Gross Income:								
Interest on Funded Debt	$ 3,604,549.24	6.860	$ 120,718.33	3.816	$ 111,173.33	3.977	$ 3,715,722.57	6.714
Interest on Unfunded Debt	12,510.73	.024	......	......	......	......	12,510.73	.023
Miscellaneous Debts	69,550.39	.132	......	......	......	......	69,550.39	.126
Total Deductions from Gross Income	$ 3,686,610.36	7.016	$ 120,718.33	3.816	$ 111,173.33	3.977	$ 3,797,783.69	6.863
Net Income Before Comparison Charges	$ 2,181,968.60	4.152	*$ 260,623.26*	*8.239*	*$ 351,446.47*	*12.571*	$ 1,830,522.13	3.308
Deduct Charter Comparison Charges:								
Taxes Assignable	$ 4,749,796.75	9.039	$ 280,356.38	8.863	$ 251,600.23	9.000	$ 5,001,396.98	9.037
Fire Insurance	98,853.11	.188	5,835.84	.185	5,522.93	.198	101,376.04	.189
Total Comparison Charges	$ 4,848,649.86	9.227	$ 286,192.22	9.048	$ 257,123.16	9.198	$ 5,105,773.02	9.226
Profit and Loss Balance	*$2,666,681.26*	*5.075*	*$ 546,815.48*	*17.287*	*$ 608,569.63*	*21.769*	*$ 3,275,250.89*	*5.918*

Italics denote Loss or Deficiency.

Exhibit "D"—Fund Balance Sheet as at June 30, 1933

	Municipal Railway Operating	Accident Reserve	Depreciation Reserve	Total
Resources:				
Available Cash	$250,468.94	$ 6,881.50	$ 318,070.43	$ 575,420.87
*Other Resources	36,283.35			36,283.35
Due from Other Funds	3,920.22		1,186,114.09	1,190,034.31
	$290,672.51	$ 6,881.50	$1,504,184.52	$1,801,738.53
Liabilities and Unencumbered Balances:				
**Reserves	$ 63,945.79			$ 63,945.79
Due to Other Funds	1,186,114.09	$ 3,920.22		1,190,034.31
Unencumbered Balances	*959,387.37*	2,961.28	1,504,184.52	547,758.43
	$290,672.51	$ 6,881.50	$1,504,184.52	$1,801,738.53

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*Acounts Receivable Due from:

Board of State Harbor Commissioners, Bus Subsidy	$10,372.12
Pacific Gas and Electric Company, Pole Rental	764.00
Crab Fishermen's Protective Association, Lot Rental	50.00
Accrued Interest on Deposits with City Treasurer	2,328.48
Municipal Railway Bond Interest and Redemption Fund	22,698.75
City and County of San Francisco, Department of Public Works	70.00
	$36,283.35

**Liability for expenditures which the City Comptroller has not yet vouched.

Italics denote Loss or Deficiency.

Exhibit "E"—Statement of Budget and Actual Receipts and Expenditures for the Fiscal Year Ended June 30, 1933

	Budget	Actual	Actual Over *Under*
Receipts:			
Operating Revenue	$3,070,040.00	$2,820,600.00	*$249,440.00*
Miscellaneous Income		9,779.00	9,779.00
Embarcadero Bus Subsidy	7,000.00	10,372.00	3,372.00
Contributed from Taxes	493,970.00	466,669.00	*27,301.00*
Total Receipts	$3,571,010.00	$3,307,420.00	*$263,590.00*
Expenditures:			
Ways and Structures	$ 191,097.00	$ 149,504.00	*$ 41,593.00*
Equipment	229,220.00	178,598.00	*50,622.00*
Power	500,000.00	475,019.00	*24,981.00*
Conducting Transportation	1,923,796.00	1,725,038.00	*198,758.00*
General and Miscellaneous	216,595.00	183,912.00	*32,683.00*
Replacements	71,460.00	91,604.00	20,144.00
Claims Department and Employees' Compensation	123,980.00	69,319.00	*54,661.00*
Bond Interest	113,862.00	111,173.00	*2,689.00*
Bond Redemption	201,000.00	201,000.00	
Total Expenditures	$3,571,010.00	$3,185,167.00	*$385,843.00*
Net Saving Over Budget Estimate		$ 122,253.00	$122,253.00

Italics denote Loss or Deficiency.

Exhibit "F"—Statement of Bus Line Operations for the Fiscal Year Ended June 30, 1933

Revenues:		Routes	
	Combined	Embarcadero	Others
Passenger Revenue	$ 88,280.20	$29,868.10	$ 58,412.10
Revenue Credits:			
Quartermaster Tickets	15.80	10.45	5.35
School Tickets	3,010.60	11.23	2,999.37
Local Transfers	26,403.73		26,403.73
Total Revenue	$117,710.33	$29,889.78	$ 87,820.55
Operating Expenses:			
Repairs, Painting, etc.	$ 24,330.71	$ 5,216.24	$ 19,114.47
Tires, Including Repairs	6,886.13	1,485.21	5,400.92
Gasoline and Oil	20,310.49	4,354.86	15,955.63
Cleaning, Washing, and Servicing	13,109.39	2,823.13	10,286.26
Conductors, and Chauffeurs' Salaries and Wages	55,952.20	12,616.91	43,335.29
Depreciation of Buses and Equipment	12,843.87	5,107.69	7,736.18
Proportion of General Expense:			
Insurance	15,392.83	3,293.69	12,099.14
Administrative Salaries	9,440.00	2,031.93	7,408.07
Pension Fund Payments	3,819.63	818.56	3,001.07
Equipment Rental	1,314.00	251.60	1,062.40
Garage Rental	2,560.68	154.14	2,406.54
Storeroom Expense	3,634.79	780.58	2,854.21
Stationery and Printing	780.00	64.86	715.14
Total Expense	$170,374.72	$38,999.40	$131,375.32
Loss from Operations	*$ 52,664.39*	*$ 9,109.62*	*$ 43,554.77*
Add: Interest on Investment	7,636.66	1,262.50	6,374.16
Net Loss for Period	*$ 60,301.05*	*$10,372.12*	*$ 49,928.93*

Italics denote Loss or Deficiency.

Schedule 1—Schedule of Road and Equipment as at June 30, 1933

Account Number		Balance June 30, 1932	Additions Fiscal Year 1932-33 Depreciation Reserve Fund	Additions Fiscal Year 1932-33 Municipal Railway Fund	Total	Retirements During Fiscal Year 1932-33	Net Additions Fiscal Year 1932-33	Balance June 30, 1933
Way and Structure:								
501	Engineering and Superintendence	$ 404,533.09	$ 594.28		$ 594.28	$ 590.21	$ 4.07	$ 404,537.16
502	Right of Way	169,839.07						169,839.07
503	Other Land Used in Electric Railway Operations	265,490.48						265,490.48
504	Grading	455,768.35						455,768.35
505	Ballast	324,673.12	27.82		27.82	21.00	6.82	324,679.94
506	Ties	171,840.94	153.62		153.62	188.00	*34.38*	171,806.56
507	Rails, Rail Fastenings, and Joints	850,083.14	1,415.15		1,415.15	1,484.85	*69.70*	850,013.44
508	Special Work	299,729.72	3,820.00		3,820.00	6,052.00	*2,232.00*	297,497.72
510	Track and Roadway Work	696,755.42	3,137.33		3,137.33	2,146.76	990.57	697,745.99
511	Paving	1,109,049.52	955.15		955.15	1,117.00	*161.85*	1,108,887.67
512	Roadway Machinery and Tools	16,740.19						16,740.19
513	Tunnels and Subways	13,600.00						13,600.00
515	Bridges, Trestles, Culverts	4,231.42						4,231.42
516	Crossings, Fences, Signs	41,810.19						41,810.19
517	Signals and Interlocking Apparatus	2,341.65						2,341.65
518	Telephone and Telegraph Lines	162.49						162.49
519	Poles and Fixtures	251,585.65				135.00	*135.00*	251,450.65
520	Underground Conduits	142,495.30						142,495.30
521	Distribution System	730,429.26	3,742.62		3,742.62	2,820.90	921.72	731,350.98
523	Shops and Car Houses	859,012.37						859,012.37
524	Stations, Miscellaneous Buildings, and Structures	35,474.69						35,474.69
527	Cost of Road Purchased	44,154.47						44,154.47
529	Other Expenditures, Way and Structures	72,469.40	551.08		551.08	282.00	269.08	72,738.48
	Total Way and Structures	$6,962,269.93	$14,397.05		$14,397.05	$14,837.72	$ *440.67*	$6,961,829.26
Equipment:								
530A	Passenger and Combination Cars, Electric	$1,535,763.72						$1,535,763.72
530B	Passenger and Automotive Cars, Automotive	169,915.43						169,915.43
532A	Service Equipment, Electric	13,871.11						13,871.11
532B	Service Equipment, Automotive	29,662.31	$ 1,790.00	$ 799.00	$ 2,589.00	$ 2,218.25	$ 370.75	30,033.06
533	Electric Equipment of Cars	764,028.91						764,028.91
536	Shop Equipment	40,125.64		23.50	23.50		23.50	40,149.14
537	Furniture and Office Equipment	27,974.09		275.34	275.34	25.50	249.84	28,223.93
	Total Equipment	$2,581,341.21	$ 1,790.00	$1,097.84	$ 2,887.84	$ 2,243.75	$ 644.09	$2,581,985.30
General and Miscellaneous:								
546	Law Expenditures	$ 13,889.66						$ 13,889.66
550	Miscellaneous	8,982.26						8,982.26
	Total General and Miscellaneous	$ 22,871.92						$ 22,871.92
	Total Road and Equipment	$9,566,483.06	$16,187.05	$1,097.84	$17,281.89	$17,081.47	$ 203.42	$9,566,686.48

Italics denote Loss or Deficiency.

Schedule 2—Analysis Reserve for Depreciation as at June 30, 1933

	Provision for Depreciation				
Fiscal Year Ended	Total	Assets in Property Ledger	Track Roadway and Distributing System	Cost of Track Roadway and Distributing System	Resulting Rate of Depreciation on Track Roadway and Distributing System
1913	$ 24,291.63	$ 2,287.30	$ 22,004.33	$ 887,741.07	2.479%
1914	146,458.00	14,691.43	131,766.57	2,506,629.27	5.257%
1915	187,567.61	38,032.38	149,535.23	2,693,316.20	5.552%
1916	242,627.10	49,699.27	192,927.83	2,946,048.47	6.549%
1917	158,432.96	50,503.64	107,929.32	3,386,455.14	3.187%
1918	218,247.05	51,130.43	167,116.62	3,657,705.59	4.569%
1919	226,063.53	51,790.20	174,273.33	3,933,344.91	4.431%
1920	279,655.18	53,103.95	226,551.23	3,961,963.23	5.718%
1921	307,446.06	55,555.96	251,890.10	3,971,484.49	6.342%
1922	310,748.77	58,138.62	252,610.15	4,080,339.75	6.191%
1923	327,203.43	62,666.43	264,537.00	4,154,343.16	6.368%
1924	361,761.63	73,409.56	288,352.07	4,295,786.51	6.712%
1925	379,157.68	78,927.16	300,230.52	4,490,693.53	6.686%
1926	403,370.26	85,426.66	317,943.60	4,664,565.16	6.816%
1927	239,851.34	91,192.69	148,658.65	4,772,312.31	3.115%
1928	254,047.02	113,718.19	140,328.83	4,854,615.62	2.891%
1929	263,823.68	118,475.19	145,348.49	5,437,166.54	2.673%
1930	281,373.60	115,642.68	165,730.92	5,506,689.55	3.010%
1931	283,536.12	118,431.22	165,104.90	5,546,137.51	2.977%
1932	285,893.02	117,388.73	168,504.29	5,580,670.72	3.019%
1933	286,994.49	106,494.73	180,499.76	5,580,230.05	3.235%
	$5,468,550.16	$1,506,706.42	$3,961,843.74		

Total Provision as Above		$5,468,550.16
Deduct: Charges to Reserve on Account of Assets Retired During Fiscal Years:		
Prior Years 1928-29 to 1931-32	$211,168.11	
Fiscal Year 1932-33	13,095.36	224,263.47
Total Reserve as per Exhibit "A"		$5,244,286.69

Schedule 3—Statement of Operating Expenses by Primary Accounts as Prescribed by the Interstate Commerce Commission for the Fiscal Year Ended June 30, 1933

Account Number	Description	Amount	Total
Way and Structures:			
1	Superintendence of Way and Structures	$ 6,276.50	
2	Ballast	12.32	
3	Ties	161.70	
4	Rails	3,162.07	
5	Rail Fastenings and Joints	6,068.07	
6	Special Work	480.16	
8	Track and Roadway Labor	63,263.03	
9	Miscellaneous Track and Roadway Expense	2,477.59	
10	Paving	13,140.52	
11	Cleaning and Sanding Track	26,896.73	
13	Tunnels and Subways	2,694.93	
16	Crossings, Fences, and Signs	262.48	
17	Signal and Interlocking Apparatus	235.01	
18	Telephone and Telegraph Lines	1.97	
20	Poles and Fixtures	1,690.47	
22A	Overhead Feeders	410.08	
22B	Underground Feeders	1,308.45	
22C	Track Bonding	375.45	
22D	Overhead Trolleys	20,724.21	
23	Miscellaneous Electric Line Expense	196.92	
24C	Car Houses	820.73	
24D	Shops	3.83	
24E	General Offices	80.51	
24F	Station and Waiting Rooms and Platforms	533.71	
24H	Miscellaneous Buildings and Structures	107.61	
	Total Way and Structures		$ 150,424.73
Equipment:			
29	Superintendence of Equipment	$ 3,905.27	
30	Passenger Cars	109,253.27	
32	Service Equipment	221.07	
33	Electric Equipment of Cars	27,954.37	
36	Shop Equipment	134.53	
37	Shop Expenses	4,496.67	
38	Vehicles	1,338.36	
39A	Repairs to Motor Buses Owned	9,616.74	
39B	Painting Buses	1,284.13	
39C	Chassis, Labor and Material, Buses	4,239.27	
39D	Bus Tires, Including Repairs	6,886.13	
39E	Bus Body Repairs	2,946.98	
39F	Bus Collision Expense	156.88	
39G	Transmission Labor and Materials, Buses	4,133.85	
39H	Brake Work, Buses	1,952.86	
41C	Loss on Service Equipment Retired	77.81	
	Total Equipment		$ 178,598.19

Schedule 3—Statement of Operating Expenses by Primary Accounts as Prescribed by the Interstate Commerce Commission for the Fiscal Year Ended June 30, 1933

Account Number	Description	Amount	Total
Power:			
45	Superintendence of Power	$ 676.11	
47	Power Plant Equipment	176.70	
59	Power Purchased	469,390.16	
59A	Power Purchased for Lighting Car Barns	3,295.72	
59B	Power Purchased for Lighting Tunnels	1,479.90	
	Total Power		$ 475,018.59
Conducting Transportation:			
63	Superintendence of Transportation	$ 96,131.09	
64A	Conductors	701,726.58	
64B	Motormen	675,166.35	
66	Miscellaneous Car Service Employees	4,160.27	
67B	Lubricants and Waste	2,033.30	
67C	Special Agents and Fare Registers	3,660.19	
67D	Incandescent Lamps	1,861.60	
67E	Miscellaneous Car Service Expenses	1,510.45	
68	Station Employees	9,684.28	
69	Station Expenses	1,947.82	
70	Car House Employees	127,126.46	
71	Car House Expenses	5,400.35	
73	Operation of Telephone and Telegraph Lines	4,577.58	
78	Miscellaneous Transportation Expenses	679.39	
78A	Gasoline Buses	18,762.24	
78B	Oil Buses	1,548.25	
78C	Conductors and Chauffeurs, Buses	55,952.20	
78D	Greasing and Servicing, Buses	9,978.79	
78E	Cleaning and Washing, Buses	3,130.60	
	Total Conducting Transportation		$1,725,037.79

General and Miscellaneous:

83	Salaries and Expenses, General Officers	$ 14,887.96	
84	Salaries and Expenses, General Office Clerks	19,574.65	
85	General Office Supplies and Expenses	4,599.75	
88	Pensions and Gratuities	93,597.12	
88A	Pension Costs, Buses	3,819.63	
89	Miscellaneous General Expense	6,777.05	
89A	Administration, Buses	9,440.00	
92D	Compensation Payments to Employees	11,443.75	
93	Insurance	66.96	
94	Stationery and Printing	4,368.63	
94A	Tickets and Transfers	6,833.72	
95	Store Expenses	8,459.13	
96	Garage and Stable Expense	1,972.08	
97	Rent of Tracks and Terminals	9,517.14	
	Total General and Miscellaneous		$ 195,357.57
	Transportation for Investment, Credit		*921.50*
	Total Operating Expenses		$2,723,515.37

(END—REPORT OF AUDIT 1932-1933)

Italics denote Loss or Deficiency.

Comparative Statement Data for Fiscal Years Ended June 30, 1933, and June 30, 1932

	Fiscal Year Ended June 30, 1933				Fiscal Year Ended June 30, 1932			
	Total	Ratio to Passenger Revenue	Per Car Mile	Per Car Hour	Total	Ratio to Passenger Revenue	Per Car Mile	Per Car Hour
Passenger Revenue	$2,795,455.72	100.000	.3022	3.0445	$3,163,188.68	100.000	.3237	3.1774
Operating Expenses	2,723,515.37	97.426	.2944	2.9664	2,982,620.18	94.292	.3050	2.9960
Interest on Funded Debt	111,173.33	3.977	.0120	.1211	120,718.33	3.816	.0123	.1213
Provision for Depreciation	286,994.49	10.266	.0312	.3126	285,893.02	9.038	.0293	.2872
Provision for Accidents	70,515.00	2.522	.0076	.0768	79,733.87	2.520	.0081	.0801
Taxes (Comparative Charge)	251,600.23	9.000	.0272	.2740	280,356.38	8.863	.0287	.2816
Fire Insurance (Comparative Charge)	5,522.93	.197	.0006	.0060	5,835.84	.184	.0006	.0058
Net Loss (See Exhibit "C")	*608,569.63*	*21.770*	*.0658*	*.6628*	*546,815.48*	*17.287*	*.0560*	*.5493*
Passenger Car and Bus Mileage	9,251,492.24				9,770,683.00			
Passenger Car and Bus Hours	918,119.40				995,523			
Platform Expense	1,432,845.13	51.256	.1549	1.5606	1,589,458.10	50.248	.1627	1.5966
Number of Passenger Cars Owned	234				234			
Number of Work Cars Owned	6				6			
Total Number of Cars Owned	240				240			
Total Number of Buses Owned	19				19			
Total Number of Cars and Buses Owned	259				259			
*Revenue Passengers Carried	57,433,243		6.208	62.56	64,717,725		6.623	65.01
Free Transfer Passengers Carried	13,592,116		1.469	14.80	14,592,904		1.494	14.66
Free Passengers (Employees, Police, etc.)	789,927		.085	.86	812,609		.083	.81
Total Passengers Carried	71,815,286		7.762	78.22	80,123,238		8.200	80.48

Note: Above includes Bus Operation.

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*Transfers received at Fillmore and Union Streets treated as revenue passengers pending result of present litigation with Market Street Railway Company.

Italics denote Loss or Deficiency.

Comparative Operating Receipt Statement Between Fiscal Years Ending June 30, 1933, and June 30, 1932, Respectively

Fiscal Year Ended June 30, 1933

Line	Receipts	Car Hours	Receipts Per Car Hour
A	$ 84,689.20	28,280	$2.99
B	371,336.00	111,488	3.33
C	285,642.35	95,047	3.01
D	196,238.20	59,118	3.32
E	159,332.15	71,283	2.24
F	265,528.55	61,988	4.28
H	190,812.60	82,242	2.32
J	224,685.45	68,253	3.29
K	265,501.60	83,201	3.19
L	254,401.65	82,863	3.07
M	8,030.60	9,640	.83
N	327,372.40	96,586	3.39
O	4,004.55	1,682	2.38
Total	$2,637,575.30	851,671	$3.10

Above receipts are for 5c fares only.

Total Receipts (Bus Lines not included) $2,743,515.25

Total Receipts per Car Hour (Bus Lines not included) 3.22

Bus Lines

Receipts	Bus Hours	Receipts Per Bus Hour
$88,203.75	66,449	$1.33

Total Receipts (all sources) $2,831,719.00

Total Bus and Car Hours 918,120

Total Receipts per Bus and Car Hour 3.08

Fiscal Year Ended June 30, 1932

Line	Receipts	Car Hours	Receipts Per Car Hour
A	$ 228,492.70	70,449	$3.24
B	391,990.35	105,243	3.72
C	280,160.70	89,839	3.12
D	225,105.75	66,672	3.38
E	175,439.85	76,174	2.30
F	283,295.60	62,575	4.53
H	205,341.25	82,392	2.49
J	257,454.95	74,456	3.46
K	298,405.65	93,178	3.20
L	276,835.20	88,471	3.13
M	8,876.55	9,667	.92
N	360,438.55	103,257	3.49
O	8,921.15	3,645	2.45
Total	$3,000,758.25	926,018	$3.24

Above receipts are for 5c fares only.

Total Receipts (Bus Lines not included) $3,104,114.35

Total Receipts per Car Hour (Bus Lines not included) 3.35

Bus Lines

Receipts	Bus Hours	Receipts Per Bus Hour
$96,263.40	69,506	$1.38

Total Receipts (all sources) $3,200,377.75

Total Bus and Car Hours 995,524

Total Receipts per Bus and Car Hour 3.21

Comparison

Line	Receipts	Car Hours	Receipts Per Car Hour
A	*$143,803.50*	*42,169*	*$0.25*
B	*20,654.35*	6,245	*.39*
C	5,481.65	5,208	*.11*
D	*28,867.55*	*7,554*	*.06*
E	*16,107.70*	*4,891*	*.06*
F	*17,767.05*	*587*	*.25*
H	*14,528.65*	*150*	*.17*
J	*32,769.50*	*6,203*	*.17*
K	*32,904.05*	*9,977*	*.01*
L	*22,433.55*	*5,608*	*.06*
M	*845.95*	*27*	*.09*
N	*33,066.15*	*6,671*	*.10*
O	*4,916.60*	*1,963*	*.07*
Total	*$363,182.95*	*74,347*	*$0.14*

Above receipts are for 5c fares only.

Total Receipts (Bus Lines not included) *$360,599.10*

Total Receipts per Car Hour (Bus Lines not included) *.13*

Bus Lines

Receipts	Bus Hours	Receipts Per Bus Hour
$8,059.65	*3,057*	*$0.05*

Total Receipts (all sources) *$368,658.75*

Total Bus and Car Hours *77,404*

Total Receipts per Bus and Car Hours *.13*

NOTE: Line "O" commenced operation June 1, 1932, and discontinued operation July 15, 1932.
Line "A" discontinued operation December 5, 1932.
Bus Line No. 2 discontinued operation January 3, 1933.

Italics denote Loss or Deficiency.

Cost Statement—Itemized Accounts

Car Operation, Fiscal Year July 1, 1932, to June 30, 1933

Account Number	Name	Amount	Per Car Mile	Per Car Hour
I.	**Way and Structures:**			
1	Superintendent, Way and Structures	$ 6,276.50	.00073	.00737
2	Ballast	12.32	.00000	.00001
3	Ties	161.70	.00002	.00019
4	Rails	3,162.07	.00037	.00371
5	Rail Fastenings and Joints	6,068.07	.00070	.00713
6	Special Work	*480.16*	*.00006*	*.00056*
8	Track and Roadway Labor	63,263.03	.00735	.07428
9	Miscellaneous Track and Roadway Exp.	2,477.59	.00029	.00291
10	Paving	13,140.52	.00153	.01543
11	Cleaning and Sanding Tracks	26,896.73	.00312	.03158
13	Tunnels and Subways	2,694.93	.00031	.00316
16	Crossings, Fences, Guards, Signs	262.48	.00003	.00031
17	Signal and Interlocking Systems	235.01	.00003	.00028
18	Telephone and Telegraph System	1.97	.00000	.00000
20	Poles and Fixtures	1,690.47	.00020	.00198
22	Distributing System	22,818.19	.00265	.02679
23	Miscellaneous Electric Line Exp.	196.92	.00002	.00023
24	Buildings, Fixtures and Grounds	1,546.39	.00018	.00182
	Total—Way and Structures	$ 150,424.73	.01747	.17662
II.	**Equipment:**			
29	Superintendent of Equipment	$ 3,905.27	.00045	.00459
30	Passenger and Combination Cars	109,253.27	.01269	.12828
32	Service Equipment	221.07	.00003	.00026
33	Electric Equipment of Cars	27,954.37	.00325	.03282
36	Shop Equipment, Machinery and Tools	134.53	.00002	.00016
37	Shop Expenses	4,496.67	.00052	.00528
38	Vehicles and Horses	1,338.36	.00015	.00157
41	Equipment Retired	77.81	.00001	.00009
	Total—Equipment	$ 147,381.35	.01712	.17305
III.	**Power:**			
45	Superintendent of Power	$ 676.11	.00008	.00079
47	Power Plant Equipment	176.70	.00002	.00021
59	Power Purchased	474,165.78	.05507	.55675
	Total—Power	$ 475,018.59	.05517	.55775

Italics denote Loss or Deficiency.

Account Number	Name		Amount	Per Car Mile	Per Car Hour
IV.	**Conducting Transportation:**				
63	Superintendent of Transportation		$ 96,131.09	.01116	.11287
64	Conductors, Motormen		1,376,892.93	.15992	1.61670
66	Miscellaneous Car Service Employees		4,160.27	.00048	.00488
67	Miscellaneous Car Service Expenses		9,065.54	.00105	.01064
68	Station Employees		9,684.28	.00112	.01137
69	Station Expenses		1,947.82	.00023	.00229
70	Car House Employees		127,126.46	.01477	.14927
71	Car House Expenses		5,400.35	.00063	.00634
73	Operation of Tel. and Tel. System		4,577.58	.00053	.00538
78	Other Transportation Expenses		679.39	.00008	.00080
	Total—Conducting Transportation		$1,635,665.71	.18997	1.92054
VI.	**General and Miscellaneous:**				
83	Salaries and Expenses General Officers		$ 14,887.96	.00173	.01748
84	Salaries and Expenses General Office Clerks		19,574.65	.00227	.02298
85	General Office Supplies and Expenses		4,599.75	.00053	.00540
88	Pensions and Gratuities		93,597.12	.01087	.10990
89	Miscellaneous General Expenses		6,777.05	.00079	.00796
92	Injuries and Damages (Employees)		11,443.75	.00133	.01344
93	Insurance		66.96	.00001	.00008
94	Stationery and Printing		11,202.35	.00130	.01315
95	Store Expenses		8,459.13	.00098	.00993
96	Garage and Stable Expenses		1,972.08	.00023	.00232
97	Rent of Tracks and Terminals		9,517.14	.00111	.01117
	Credit Charges to Bus Line Operations		*8,289.47*	*.00096*	*.00973*
	Total—General and Miscellaneous		$ 173,808.47	.02019	.20408
VII.	*Transportation for Inv. Cr.*		*$ 921.50*	*.00011*	*.00108*
	RECAPITULATION				
I.	Way and Structures		$ 150,424.73	.01747	.17662
II.	Equipment		147,381.35	.01712	.17305
III.	Power		475,018.59	.05517	.55775
IV.	Conducting Transportation		1,635,665.71	.18997	1.92054
VI.	General and Miscellaneous		173,808.47	.02019	.20408
VII.	*Transportation for Inv. Cr.*		*921.50*	*.00011*	*.00108*
	Total Recapitulation		$2,581,377.35	.29981	3.03096
	Depreciation Reserve	$286,994.49			
	(Less Applicable to Buses)	12,843.87	274,150.62	.03184	.32190
	Accident Reserve	$ 70,515.00			
	(Less Applicable to Buses)	15,392.83	55,122.17	.00640	.06472
	Grand Total		$2,910,650.14	.33805	3.41758
	Actual Payments and Accident Costs	$ 57,875.01			
	(Less Applicable to Buses)	2,852.67	$ 55,022.34		

Car Mileage	8,610,125
Car Hours	851,670

NOTE: Bus Line Operation not included.

Italics denote Loss or Deficiency.

Cost Statement—Itemized Accounts

Bus Operation, Fiscal Year July 1, 1932, to June 30, 1933

Account Number	Name	Amount	Per Bus Mile	Per Bus Hour
II.	**Equipment:**			
39A	Bus Engines, Labor and Material	$ 9,616.74	.01499	.14472
39B	Painting Buses	1,284.13	.00200	.01933
39C	Chassis, Buses, Labor and Material	4,239.27	.00661	.06380
39D	Bus Tires, Including Repairs	6,886.13	.01074	.10363
39E	Bus Body Repairs	2,946.98	.00459	.04435
39F	Repairs to Garage Equipment	156.88	.00024	.00236
39G	Transmission—Labor and Material, Buses	4,133.85	.00645	.06221
39H	Brake Work—Labor and Material, Buses	1,952.86	.00305	.02939
	Total—Equipment	$ 31,216.84	.04867	.46979
IV.	**Conducting Transportation:**			
78A	Gasoline—Buses	$ 18,762.24	.02925	.28236
78B	Oil—Buses	1,548.25	.00242	.02330
78C	Conductor-Chauffeurs—Buses	55,952.20	.08724	.84203
78D	Greasing and Servicing—Buses	9,978.79	.01556	.15017
78E	Cleaning and Washing—Buses	3,130.60	.00488	.04711
	Total—Conducting Transportation	$ 89,372.08	.13935	1.34497
VI.	**General and Miscellaneous:**			
88A	Pension Costs—Buses	$ 3,819.63	.00596	.05748
89A	Administration—Buses	9,440.00	.01472	.14206
94	Stationery and Printing	780.00	.00121	.01174
95	Store Expenses	3,634.79	.00567	.05470
98	Rent of Equipment—Service	1,314.00	.00205	.01977
98A	Garage Rental—Buses	2,560.68	.00399	.03854
	Total—General and Miscellaneous	$ 21,549.10	.03360	.32429

RECAPITULATION OF COST STATEMENT

Buses

Account Number	Name	Amount	Per Bus Mile	Per Bus Hour
II.	Equipment	$ 31,216.84	.04867	.46979
IV.	Conducting Transportation	89,372.08	.13935	1.34497
VI.	General and Miscellaneous Expenses	21,549.10	.03360	.32429
	Total	$142,138.02	.22162	2.13905
Injuries and Damages (Reserves)		$ 15,392.83	.02400	.23165
Depreciation		12,843.87	.02002	.19329
	Total Oper. Expense and Reserves	$170,374.72	.26564	2.56399
Interest on Investment		7,636.66	.01191	.11492
	Total—Bus Costs	$178,011.38	.27755	2.67891

Bus Mileage	641,368
Bus Hours	66,449

Summary of Income and Outlay

December 28, 1912, to June 30, 1933

Income:		
Passenger and Other Revenue	$55,628,306.33	
Subsidy from Harbor Commission	53,419.93	
Contributed	1,434,483.57	
Interest on Bonds and Daily Balances	621,747.43	
Miscellaneous Credits—Profit and Loss	272,338.68	
Cash Received from Sale of Original Bonds Issued	5,481,000.00	
Total Income and Credits		$63,491,295.94
Outlay:		
Operating Expenses	$44,093,354.54	
Bond Interest Charges	3,715,722.57	
Injuries and Damages	1,267,168.23	
Miscellaneous Debits—Profit and Loss	82,061.12	
Total Expenses		49,158,306.46
Excess of Income Over Expenses		$14,332,989.48
*Bonds Redeemed		3,279,000.00
Balance After Expenses and Bond Redemption		$11,053,989.48
Expended for Construction, Extensions, Betterments, Replacements and Renewals, and Road and Equipment Retired		10,235,652.67
Balance, Net Cash, Receivables, Stores on hand, etc. (See next page for detail.)		$ 818,336.81
Sources of Funds:		
From Bond Sales	$ 5,481,000.00	
Depreciation Reserve Fund	616,758.71	
Earnings and Contributions	4,330,481.04	
	$10,428,239.75	
Deduct Retirements	532,322.89	
	$ 9,895,916.86	
Add Portions of Retirements Charged to Reserve	339,735.81	
	$10,235,652.67	

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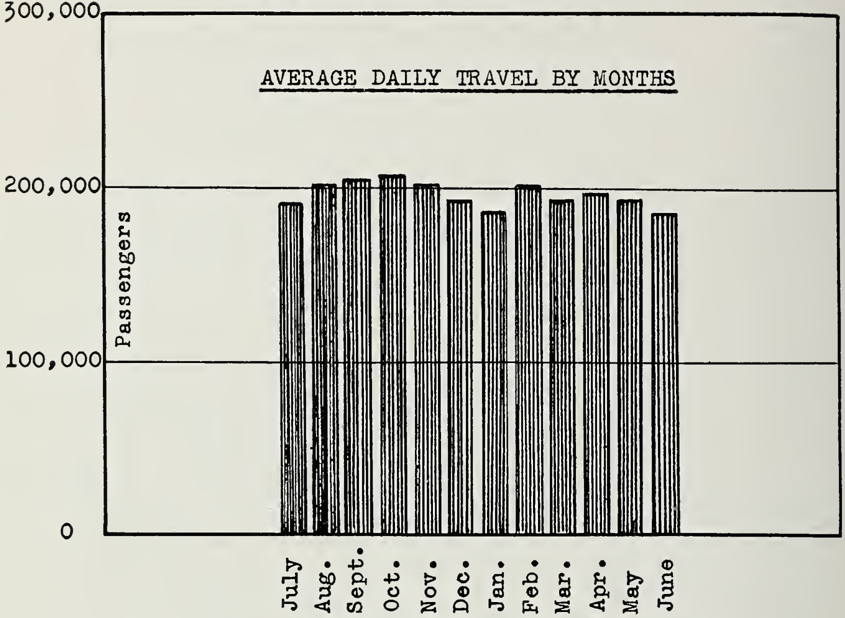
*Note: $101,000.00 Additional Due to Be Redeemed July 1, 1933.

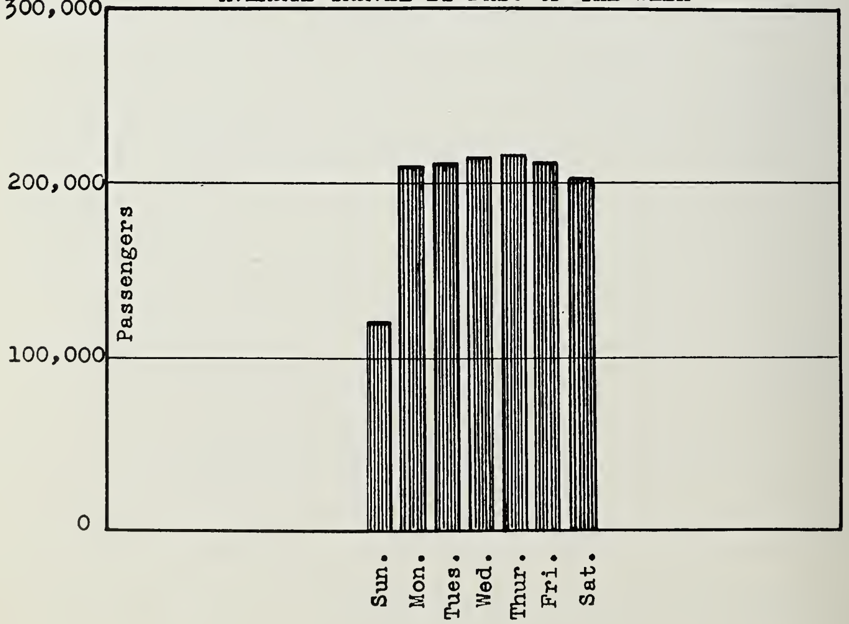
Cash:		
Superintendent's Fund, Net	$ 4,000.00	
Operating Fund, Net	250,468.94	
**Accident Reserve Fund, Net	6,881.50	
Depreciation Reserve Fund, Net	318,070.43	
Bond Redemption Fund, Net	119,019.79	
Bond Interest Fund, Net	14,476.39	
Total Net Cash		$ 712,917.05
Accounts Receivable:		
Due from City and County of San Francisco		
Due from Harbor Commission	$ 10,372.12	
Miscellaneous Accounts Receivable	3,212.48	
Total Accounts Receivable		13,584.60
Stores:		
At Car Barn	$ 61,453.43	
At Pipe Yard	106,579.18	
Total Stores		168,032.61
Deferred Assets:		
Rents and Insurance Premiums Paid in Advance		
Miscellaneous Deferred Items	$ 626.67	
Total Deferred Assets		626.67
Total Cash, Receivables, Stores, etc		$ 895,160.93
Liabilities:		
Loans and Notes Payable		
Accounts Payable	$ 63,945.79	
Accrued Interest, Not Due	12,878.33	
Total Liabilities		76,824.12
Net Free Assets		$ 818,336.81

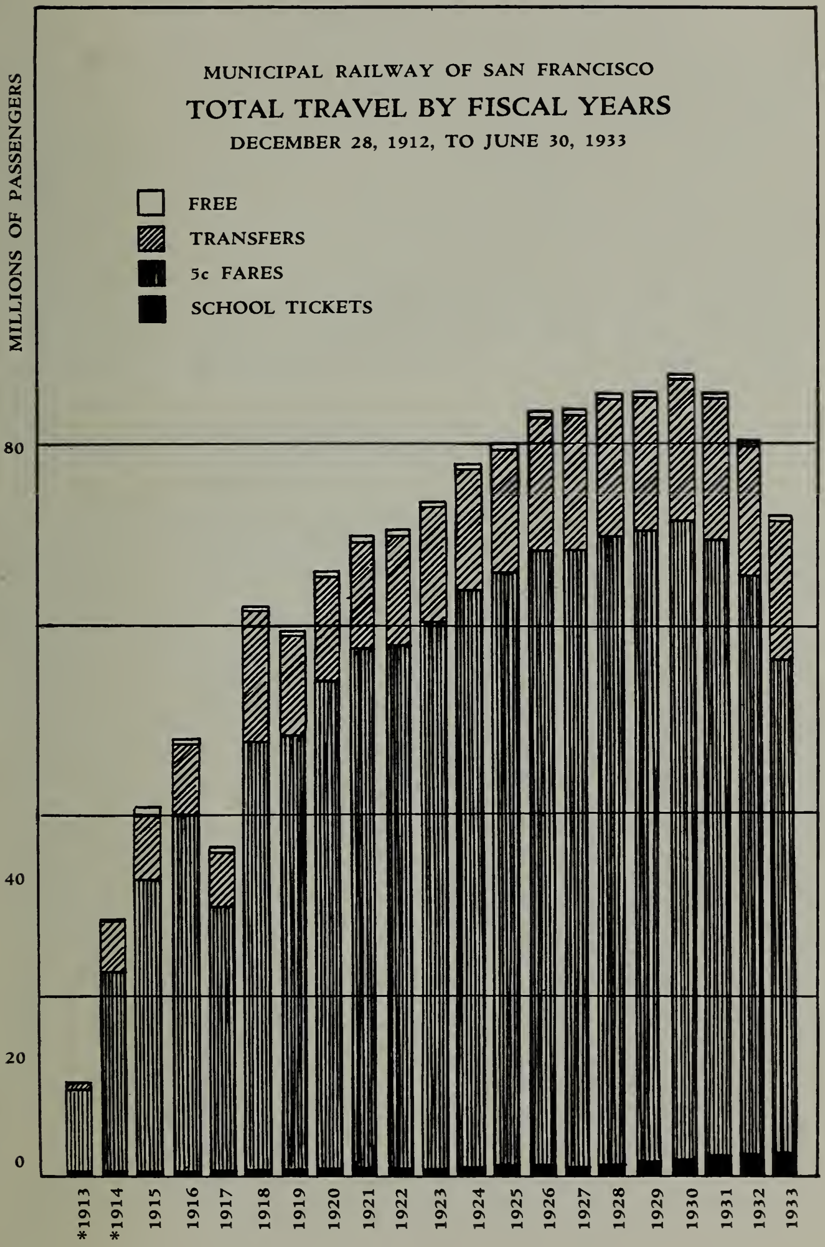
**Note: $3,920.22 Due to Operating Fund.

Fiscal Year Ended June 30, 1933.


AVERAGE DAILY TRAVEL BY MONTHS

AVERAGE TRAVEL BY DAYS OF THE WEEK





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*1913 and 1914, calendar years.

Mileage—Single Track—June 30, 1933

Operated Track:		
Track Owned and Operated June 30, 1933	73.88	
Track Owned and Operated Jointly with the Market Street Railway Company	4.30	
Total Operated Track		78.18
Non-Operated Track, Sidings, Turn-outs, etc.:		
Tenth Avenue, Between Geary and Fulton Streets	1.02	
Masonic Avenue Spur	.46	
Polk and Geary Streets Spur	.05	
Columbus Avenue, Between Washington and Jackson Sts.	.08	
Geary Street Car Barn, Sidings and Turn-outs	2.18	
Seventeenth Street Car Barn, Sidings and Turn-outs	1.65	
Total		5.44
Total Single Track Mileage, June 30, 1933		83.62

Miles, Routes and Route Mileage—June 30, 1933

LINE "B"	14.12	Ocean to Ferries via Geary Street.
LINE "C"	11.82	Thirty-third Avenue and California Street to Ferries via California and Geary Streets.
LINE "D"	8.48	Presidio to Ferries via Van Ness Avenue and Geary Streets.
LINE "E"	7.54	Presidio to Ferries via Union Street and Columbus Avenue.
LINE "F"	6.16	Scott and Chestnut Streets to Market, Fourth and Ellis via Chestnut and Stockton Streets.
LINE "H"	9.32	Army Street and Potrero Avenue to Fort Mason Transport Docks via Potrero and Van Ness Avenues.
LINE "J"	9.12	Thirtieth and Church Streets to Ferries via Church and Market Streets.
LINE "K"	15.34	Grafton and Brighton Avenues to Ferries via Ocean Avenue, Twin Peaks Tunnel and Market Street.
LINE "L"	15.68	Beach to Ferries via Taraval Street, Twin Peaks Tunnel and Market Street.
LINE "M"	4.84	Plymouth Avenue and Broad Street to St. Francis Circle via Broad Street and Nineteenth Avenue.
LINE "N"	14.56	Ocean Beach to Ferries via Judah Street, Sunset Tunnel and Market Street.
	116.98	Total Route Mileage.
	78.18	Total Track Mileage Operated.
	38.80	Duplicate Routes.

Operation discontinued on Tenth Avenue between Geary and Fulton Streets. Mileage on Tenth Avenue, between Geary and Fulton Streets, totaling 1.02 miles single track.

Route mileage reduced 9.06 miles single track by reason of discontinued operation of Line "A."

Bus Routes in Operation—June 30, 1933

		Miles		Miles
ROUTE NO. 1.	From Tenth Avenue and California Street via Tenth Avenue, Golden Gate Park, Ninth Avenue, Judah Street, Seventh Avenue, Laguna Honda Boulevard, Portola Drive, Miraloma Drive, Yerba Buena Drive, Plymouth Avenue and Monterey Boulevard to Genesee Street. Connects with Lines "B," "C," "K," "L" and "N." Mileage One Way	4.91	Round Trip	9.82
ROUTE NO. 4.	From Golden Gate Ferry at Hyde and Jefferson Streets via Jefferson Street, Leavenworth Street, Beach Street, The Embarcadero, Berry Street and Third Street, to Southern Pacific Depot. Mileage One Way	3.40	Round Trip	6.80
ROUTE NO. 5.	From terminus of Line "F" at Scott and Chestnut Streets via Chestnut Street and Divisadero Street, to Marina Boulevard. Mileage One Way	.47	Round Trip	.94
	Total Bus Mileage One Way	8.78	Round Trip	17.56